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EXPERIMENTS WITH FLOCCULATED INSULIN LEADING TO CHEMOTHERAPY OF CANCER WITH PHOSPHOTUNGSTIC ACID-H_2O_2 PREPARATIONS

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With the idea of protecting insulin against enzyme action the author was first led to experiment with precipitated or flocculated insulin (Mukherjee, 1930).

In connection with the author's work with precipitated insulin phosphotungstates (Mukherjee 1935, 1936) it was found that phosphotungstates, molybdates, vanadates, and many allied substances have hypoglycaemic, oxidising and diuretic actions. The oxidising actions of phosphotungstates and molybdates etc., simulate the action of oxidising enzymes. From a consideration of these properties the author was led to try the effect of these substances in cancer and a preliminary report was published in the *Calcutta Medical Journal* (1936) with a subsequent brief reference in the *Biochemical Journal* (Mukherjee, 1936). In these earlier experiments patients suffering from cancer were usually given 2 c.c. of 20 per cent solution of sodium tungstate subcutaneously thrice a week for a fortnight and the following changes were observed:—

1. Marked diminution or even disappearance of pain.
2. Decrease of discharge.
3. Some decrease in size of the growth.

In later work (it may be mentioned in passing that the author is engaged in this work for over 12 years) using sodium tungstate in bigger amounts (0·5 g to 1·0 g) subcutaneously similar results were obtained. Sodium phosphotungstate and sodium phosphomolybdate were also used in some cases of cancer and also in sarcoma. Sodium metavanadate was tried with caution on one patient (with sarcoma) in very minute (2 mg.) doses subcutaneously for a short period and was then stopped for fear of toxic action.

It was then considered worthwhile to concentrate on phosphotungstic acids. As it has been the usual custom to get the inoperable cancer cases from the author's colleagues in the surgical and gynaecological departments for a few days only for studying the effect of these preparations, it was thought proper to try the effect of bigger doses of sodium tungstate (0·5 g to 1·0 g) daily, intramuscularly and also intravenously in patients usually of 40 kg. to 60 kg. body-weight. Patients taking sodium tungstate and also sodium phosphotungstate intramuscularly daily for a fortnight or more did not show any untoward symptom. Phosphotungstic acid suitably buffered (in 0·5 g to 1·0 g doses) intramuscularly daily was also tried in some cases. Hydrogen peroxide solution (1·0 c.c.) was also given intramuscularly in a few.

By this time some of the author's colleagues in the surgical and gynaecological wards were convinced that some of these injections allay the pain of cancer in most cases and possibly cause some slight decrease in size in a few cases. Naturally on applying to them the author used to get two groups of cases (1) operable malignant cases with pain where the surgeon was waiting for biopsy report and other examination reports necessary before an operation, and (2) inoperable cases rejected also by the radiologist or in given up cases with recurrence after operation and radiological treatment. In both of these groups of patients

the author could try the effect of these injections at most for a fortnight with similar results as that mentioned before, *i.e.*, though there was agreement about the relief of pain—about regression of the tumour opinion varied.

With the idea of obtaining a more potent preparation a number of phosphotungstate derivatives were tried. Sodium salt of a phosphotungstic acid-thioglycolic acid complex prepared in the laboratory was then tried in cancer. This sodium salt solution (pH = 5 approximately) has a deep blue colour which is discharged on treatment with hydrogen peroxide solution (Peroxyl—May & Baker Ltd.) added in sufficient amount. The blue colour reappears after a short time when the solution can be again rendered colourless with further additions of H_2O_2 solution. The process can be repeated for a number of times. It appears that this complex compound can take up and also give up oxygen easily.

As the main reason for using these substances in cancer depends on their oxidising and other properties the author was next induced to experiment with phosphotungstic acid dissolved in hydrogen peroxide solution. When phospho-24-tungstic acid is dissolved in hydrogen peroxide solution a yellow colour develops due to the formation of a complex compound.

On boiling for sometime or on evaporating on a water bath the yellow colour is discharged with liberation of oxygen. The yellow colour is also discharged with liberation of oxygen, on treatment with strong alkalis.

As in the present paper the action of this yellow phosphotungstic acid-H_2O_2 preparation on cancer will be considered the method of preparation is described below.

Method of Preparation

50 g of phospho-24-tungstic acid (Merck & Co.) was placed in a glass beaker and was then dissolved in about 50 c.c. of hydrogen peroxide solution (Peroxyl—12 vols. May & Baker Ltd.) by stirring with a glass rod. The total volume was ultimately made up to 100 c.c. with further addition of hydrogen peroxide.

This 50 per cent solution of phosphotungstic acid in hydrogen peroxide was kept in a glass bottle. After a few days a slight insoluble sediment settled at the bottom. The supernatant fluid was then clear and bright yellow in colour and was carefully pipetted off (if necessary filtered) without disturbing the sediment at the bottom. The solution liberated oxygen vigorously if shaken. When one c.c. of this yellow solution was added to a solution of blood in a test tube there was no frothing showing that there was very little free H_2O_2. The solution was strongly acid in reaction and contained 0·5 g of phosphotungstic acid per c.c. Henceforth this preparation will be referred to as Preparation Y in this paper.

Buffers

As the Preparation Y is strongly acid and alkalis degrade it, various buffers were tried to reduce the acidity. Sodium lactate was considered a suitable buffer but it was soon found that mixed with sodium lactate the yellow compound was degraded. Ultimately the author had to rely on 20 per cent solution of sodium tungstate in water as buffer.

When 1·0 c.c. of Preparation Y was mixed with 1·0 c.c. of 20 per cent solution of sodium tungstate the pH of the resulting mixture was 4·5 (about). This pH was considered suitable for administering the material by injection.

Dose and Method of Administration

The average body-weight of the patients with cancer on whom Preparation Y was tried was about 50 kg. (40 kg.-60 kg.). 1 c.c. of Preparation Y (0·5 g of Phosphotungstic acid) buffered with 1 c.c. of 20 per cent sodium tungstate (0·2 g of sodium tungstate) was considered a safe dose to be injected daily for a prolonged period. In some cases twice this dose once daily or by two injections morning and evening was given without any ill effect.

Preparation Y and the 20 per cent sodium tungstate solution were kept separately in different bottles or sealed glass ampoules. Preparation Y required no sterilisation. The sodium tungstate solution was sterilised by boiling before being put into glass ampoules. Just before use 1 c.c. (or more when necessary) of Preparation Y was mixed in an all-glass syringe with an equal volume of 20 per cent sodium tungstate solution for immediate injection into the patient. Unnecessary delay in giving the injection after mixing with the buffer in the syringe may degrade the preparation.

Preparation Y was first tried intravenously on a female patient with inoperable scirrhus cancer of the right breast with involvement of axillary glands and brawny œdema of right arm associated with severe pain over right breast and right arm.

2 c.c. of Preparation Y was buffered with 2 c.c. of 20 per cent sodium tungstate and was injected intravenously daily for six days by which time pain was completely relieved. After another 10 intravenous injections of the same strength daily the brawny œdema of the right arm completely disappeared. But the intravenous injections caused nausea and marked anorexia. In fact, the first patient to take this Preparation Y intravenously bore it very well. It was tried on four other patients intravenously,—two with cancer and two with sarcoma. They could not take more than six injections. All had nausea, vomiting

and anorexia. So the intravenous administration had to be given up in favour of intramuscular injection. The intramuscular injections are painful but if the Preparation Y is properly buffered and the injections are given with a fine sharp needle in the gluteal region patients do not complain.

Effect on Cancer

Preparation Y was tried intramuscularly in 1 c.c. to 1·5 c.c. dose daily buffered with sodium tungstate in 8 inoperable cases of cancer (2 female patients with squamous celled carcinoma of cervix uteri; 2 male patients with squamous celled carcinoma of the penis; 4 female patients with cancer of the breast—2 with scirrhus cancer and 2 with adeno-carcinoma).

The author obtained consistent good results in these cases as mentioned below.

1. With Preparation Y administered intramuscularly daily the pain of cancer in most cases was completely relieved after one to six injections (1 to 6 days).

2. If the injections were continued daily, then after about 18 injections (about 18 days) definite improvement of ulcers, diminution in size of growths were observed. Fungating masses and the brawny œdema in affected arms also disappeared by this time.

Discussion

With Preparation Y administered as described above definite improvement as evidenced by relief of pain, healing of ulcers and definite diminution in size of growths were observed in many cases of cancer. Its effect was found to be more potent than that of the allied substances previously used by the author.

The introduction of Preparation Y into the body amounted to the introduction of a catalytic oxidising complex into the system, and it is expected that the use of Preparation Y or similar preparations of phosphomolybdic acids etc., in experimental animal cancer may help in the proper understanding of the metabolism of cancer cells. Moreover as phosphotungstic acids etc., react with many substances of biochemical importance in the living system their trial in cancer is indicated.* It is also expected that with further research along this line potent preparations may be produced for chemotherapy of cancer.

The cancer patients on whom these investigations were carried out were usually poor patients in free beds. It was not found possible to carry on these investigations for more than 4 weeks in any one of them for the following reason. As the cases were inoperable cancer cases it is very difficult for the surgeons in charge of the ward to keep beds occupied by incurable cases when there is a tremendous rush for new admission. The author thankfully admits, however, that even this comparatively short time has been of much help in studying the effect of these preparations on cancer. With proper facilities investigations over a longer period will be carried out. In two patients it has been possible to continue the injections for nearly six weeks. The patients remained free from pain with a feeling of well-being. The growths and ulcers remained inhibited with apparent slight further regression.

The cancer patients mentioned in this paper were all properly diagnosed as cancer cases clinically by the surgeon in charge and also by biopsy.

No toxic effect whatsoever was observed in these patients following the use of this preparation intramuscularly as described above.

Summary

1. A Phosphotungstic acid-H_2O_2 preparation is described which appears to have consistent definite beneficial effect in cancer.

2. This preparation in suitable doses when administered intramuscularly (also intravenously) daily for about a week relieves the pain of cancer. After continued daily injections for two to three weeks definite decrease in size of growths and ulcers is observed. Fungating masses and the brawny œdema of affected arms disappear and exudation from ulcer is decreased. The patients remain free from pain with a feeling of comfort.

3. For a proper understanding of the metabolism of cancer cells and also for chemotherapy of cancer further research along the line indicated in the paper is suggested.

Acknowledgment

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* A complex phosphotungstic acid-phosphomolybdic acid —H_2O_2 preparation is now being tried in cancer and the results will be reported in another communication.

NUTRITIONAL SURVEY IN GANDHI NAGAR CAMP, JULLUNDUR

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The survey was started in the middle of December 1947 when the camp had been in existence for nearly four months and was admitting fresh arrivals from Pakistan. The survey is based mostly on the naked eye clinical findings supported by some laboratory investigations possible in camp conditions.

The aim of the survey was to find out the various types of deficiencies in refugees from Western Pakistan and correct these with proper measures.

Total population of refugees examined was 6,000, out of these 500 cases were found with frank deficiency conditions so the percentage of deficiencies is about 8·3. Out of 6,000 refugees examined 2,200 were women, 2,000 men and 1,800 children between the age of 3 to 12 years.

Cases of deficiency states were distributed as follows:—Women—155, men—285, children—60.

TABLE I—SHOWING AGEWISE DISTRIBUTION OF DEFICIENCY

Age	*Male*	*Female*	*Total*	*Percentage*
3- 7 yrs. ..	9	14	23	4·6
8-12 „ ..	22	15	37	7·4
13-20 „ ..	26	37	63	12·6
21-35 „ ..	73	59	132	26·4
36-50 „ ..	83	34	117	23·4
Over 50 yrs. ..	103	25	128	25·6

It is evident from the above table that the deficiencies are almost equally distributed in the age groups above 21 years, although the incidence is almost double in men as compared to women.

Table II shows the geographical distribution of the cases suffering from deficiencies.

The people have been drawn from almost all the districts of the West Punjab and N.W.F.P. Those living in Sialkot District tops the list for deficiencies. Lyallpur, D. G. Khan and Jhang come next in order.

TABLE II—SHOWING DISTRICTWISE DISTRIBUTION OF DEFICIENCIES

Name of district	*No. of cases*	*Name of district*	*No. of cases*
Sialkot	266	Campbellpur ..	8
Lyallpur	55	Gujrat	7
D. G. Khan ..	40	Sargodha	5
Jhang	27	Montgomery ..	5
Jammun State ..	25	Rawalpindi	4
Sheikhupura ..	21	Multan	4
Muzaffargarh ..	20	D. I. Khan	2
Mianwali	9	Gujranwala ..	2

From Table III, it will be noted that in their homes a very large majority of the refugees (vegetarian and non-vegetarian in equal ratio) had a sufficient dietary, as most of them were farmers or zemindars having cows and buffaloes and so were taking all types of milk products together with fresh vegetables etc.; but the diet in the transit and at the present time are deficient or partially deficient.

TABLE III—SHOWING DIET DISTRIBUTION

	Not deficient	*Partially deficient*	*Deficient*
At Home ..	465	35	Nil
In Transit ..	25	80	395
At present ..	18	482	Nil

The present scale of rations in the Gandhi Nagar Camp is as follows:—

Diet	*Amount*	*Caloric value*
Wheat atta per unit ..	5 chhtks.	1,000
Dal	½ „	180
Sugar	¼ „	70
Vegetable ghee ..	¼ „	120
	Total ..	1370
Milk (not standardized) for children under 12 years wherever available ..	1 lb.	

Recently an addition has been made which includes parched gram one chhatak per head and potatoes wherever available. It is evident that the caloric value of the above diet just falls to the basic requirements and besides almost complete lack of suitable proteins, green vegetables, fruits and other vitaminous sources; there is an urgent need to supplement their diets as per recommendations.

TABLE IV—SHOWING THE TYPES OF DEFICIENCIES FOUND

	Cases		
Vitamin deficiencies	*Male*	*Female*	*Total*
Vitamin A	9	14	23
„ B_1	1	—	1
„ B_2	112	25	137
„ B_7 (nicotinic acid) ..	2	—	2
„ C	—	2	2
Combined deficiencies			
Vitamin B complex	147	126	273
Vitamin A and C.	1	1	2
Vitamin B_2 and C.	4	—	4
Vitamin A and B complex ..	22	13	35
Vitamin B_2 and D.	1	—	1
Vitamin B complex and C.	2	10	12
Vitamin B complex and D.	3	1	4
Vitamin A and B complex and C.	—	2	2
Vitamin A and D.	—	1	1
Vitamin B complex, C and D. ..	1	—	1

From the above table it is evident that combined deficiencies have taken a heavy toll than the pure one. Majority of the cases have presented themselves with vitamin B complex and B_2 deficiencies, accounting for about 82 per cent of the deficient cases. Next in order come vitamin A and B complex deficiencies, pure vitamin A deficiency and B complex and C deficiency. It is apparent that pure vitamin D or C deficiency is almost negligible in this series.

Table V gives an idea of presenting clinical features observed in various deficiency cases.

TABLE V—SHOWING DISTRIBUTION OF CLINICAL FEATURES

Symptoms of general vitamin deficiency	*No. of cases*
1. Soreness inside mouth	33
2. Substernal soreness	50
3. Poor appetite	63
4. Bowels—constipation	48
—diarrhœa	48
5. Indigestion	65
Vitamin A deficiency	
1. Phrynodermia	21
2. Follicular Hyperkeratosis	21
3. Night blindness	3
4. Xerosis Conjunctiva or Bitot's spots	45
5. Dry Conjunctiva	34
6. Vascularization of Cornea	6
Vitamin B complex deficiencies	
Vitamin B_1	
Peripheral neuritis	3
Wet beri beri	1
Vitamin B_2 complex	
1. Tongue changes	
Geographical tongue	84
Sides of tongue depapillated	162
Most of the tongue depapillated	40
Pigmentation of tongue	36
Fissured tongue	36
Glossitis	16
2. Ulceration inside the mouth	18
3. Angular stomatitis	123
4. Scaling lips	132
5. Cheilosis	47
6. Nasal seborrhœa	312
7. Myoedema	440
8. Mental changes	5
9. Tenderness of muscles	5
10. Cardiac dilatation	1
11. Pellagroid dermatitis	45
Vitamin C deficiency	
1. Spongy gums	37
2. Petechial hæmorrhages	2
Malnutrition œdema	7
Vitamin D deficiency	
Skeletal deformities	6

Quite a large number of cases showed associated factors even in the past history or immediately preceding or accompanying deficiency state possibly the latter may have been the precipitating cause of frank deficiency.

Under the camp conditions and lack of complete laboratory facilities full hæmograms could not be done, however, hæmoglobin percentage, total R.B.C. count and colour index were done in one hundred cases and the results were as follows:—

Only 20 per cent of the cases showed hæmoglobin above 80 per cent.

C.I. below 1 (hypochromic) .. 40 cases.
C.I. 1 (normochromic) .. 16 „
C.I. above 2 (hyperchromic) 44 „

136 cases of deficiencies gave history of old and recent dysentery. Stools after saline purgative were examined in 50 of these cases and the results were:

Number of cases	
Entamoeba histolytica—vegetative	8
cystic	10
Cellular reaction + +	6
Hookworm ova	8
Balantidium coli	1
Negative stools	25

Blood proteins were estimated in 15 cases of various types and grades of deficiency and the protein level of the plasma (specific gravity method in all these cases varied from 7 to 8·2 gm. per 100 c.c., indicating that these levels of plasma proteins are quite normal.

TABLE VI—SHOWING INCIDENCE OF ASSOCIATED DISEASES

Vitamin deficiency			*First illness*	*No. of cases*
Vit. A	Vit. B complex	Vit. A & B		
5	86	12	Dysentery	103
1	18	1	Diarrhœa	20
4	46	7	Malaria	57
—	4	—	Nervous diseases	4
1	4	2	Enteric fever	7
—	4	—	Piles	4
—	3	—	Infective hepatitis	3
—	1	—	Pneumonia	1
—	1	—	Gonorrhœa	1
			Present illness	
—	—	3	Arthritis	4
—	—	2	Pulm. tuberculosis	2
1	1	—	Infective hepatitis	2
—	3	1	Scabies	4
2	10	1	Diarrhœa	13
2	29	2	Dysentery	33
—	3	1	Enteric fever	4
—	2	—	Asthma	2
—	2	—	Adenitis	2
1	30	5	Chr. Bronchitis	36
1	1	1	Measles	3
—	15	—	Malaria	15
—	—	1	Varicose vein	1
—	—	1	Pneumonia	1
—	2	—	Heart failure	2

RESULTS OF TREATMENT

Table VII gives in detail the results of treatment.

TABLE VII—SHOWING RESULTS OF TREATMENT

Signs and symptoms	*Complete cure*	*Great improvement*	*Slight improvement*	*No effect*
Nasal seborrhœa	—	6	25	22
Sides of tongue depapillated	—	2	—	—
Most of tongue depapillated	—	2	—	—
Fisured tongue	—	3	1	—
Purple pigmentation in tongue	2	3	3	—
Ulceration inside mouth	4	—	—	—
Glossitis	3	—	—	—
Geographical tongue	5	1	2	—
Angular stomatitis	11	4	—	—
Cheilosis	9	1	—	—
Scaling lips	20	—	—	—
Pellagroid dermatitis	3	—	—	—
Follicular hyperkeratosis	1	2	—	—
Phrynoderma	3	—	—	—
Bitot's spots	3	2	—	—
Night blindness	1	—	—	—
Spongy gums	3	1	—	—
Constipation	9	2	—	—

Out of hundreds of deficiency cases getting diets rich in vitamins and synthetic vitamin preparations from the deficiency outdoor daily, records of 80 cases were taken. These patients were treated for a period of from 3 to 5 weeks with olea vitaminates (B.P.) 1 oz. to 2 oz. and multivitamin tablets (Brewer's) 3 to 6 daily. Out of these 80 patients only 5 were of pure vitamin A deficiency showing the Bitot's spots and the rest with vitamin B complex deficiency features combined in some cases with vitamin A deficiency, vitamin D deficiency and C deficiency features.

Bitot's spots cleared off in 3 out of 5 cases while in the other two there was distinct improvement at the end of the treatment. In the rest of the cases the following features responded favourably to multivitamin tablets treatment:—

Angular stomatitis; cheilosis; scaling lips; ulceration inside the mouth; tongue changes; skin changes like pellagroid dermatitis, sharks' skin and follicular hyperkeratosis; constipation.

But nasal seborrhoea persisted in most of the cases even after five weeks treatment with multi-vitamin tablets given at the rate of 6 daily.

Composition of multivitamin tablets (Brewer U.S.A.)

Vitamin A	2,500 U.S.P. Units
D (Viosterol-Hebo Process)	200 U.S.P. Units
B_1 (Thimain HCl)	1·0 mgm.
B_2 (Riboflavin)	1·5 mgm.
C (Ascorbic acid)	37·5 mgm.
Nicotinic acid amide	10·0 mgm.

So daily dose of riboflavin in 6 tablets was only 9 mgm. This may possibly explain the lack of good response in cases of ariboflavinosis. However it is observed that nasal seborrhoeaic plugs required local treatmcnt in form of removal with spirit or Eau de Cologne, in addition to riboflavin therapy. As pure riboflavin tablets were not available so the results of the pure therapy could not be assessed.

Discussions

1. From the foregoing tables it is noted that incidence of frank deficiences in refugee population comes to 8·3 per cent of the population examined; however if sub-clinical malnutrition cases are included the percentage will rise considerably. The comparatively smaller number of children with deficiency features can be explained by the fact that the parents have tried to keep up their children's health at the cost of their own.

2. *Sex incidence.* The incidence of deficiency is much more in men as compared to women, although the total population examined in the latter case is a little higher in number than in the former; this may be explained by the fact that men had been exposed to manual labour, physical exertion, fatigue and extreme exhaustion. It is also observed that men have presented with ariboflavinosis in much greater number as compared with women.

3. Geographical distribution. Highest number of deficiencies were found in Sialkot district; the next in order are Lyallpur, Jhang, and D. G. Khan areas. In case of Sialkot it is to be remembered that out of the population examined nearly half had come from this district explaining thereby the highest number of deficiencies. It is also worth noting that people from N.W.F.P. and from most of the adjoining districts of West Punjab have shown remarkably lesser deficiencies. It is thought that people from these parts live on plentiful supply of poultry, dairy products, fruits, vegetables and nuts (almond, cashew nuts, pistechio, peas and pine nuts), food-stuffs rich in vitamin contents and it seems that the vitamin reserve of these people is comparatively high.

4. *Duration of stay in transit and refugee camps.* It has been observed that the causes of eficiency in these cases seem to be the length of time they had to live on poor diets while in transit and in refugee camps in Pakistan. Added to this have been the conditions of fear, worry, anxiety, cold and privation; all these factors go in for poor appetite and lack of absorption leading to deficient state and malnutrition.

5. The comparatively high incidence of vitamin B complex deficiency can be explained by the fact that these people had been exposed to severe strain, stress, anxiety and lack of vitamin B complex in diet.

6. *Myoedema.* The sign of myoedema was present in 440 cases out of 500 *i.e.* in about 90 per cent of the cases of deficiency. It is agreed by some of the workers on malnutrition that it indicates deficiency, but however, it required further elucidation and research.

7. *Nasal seborrhœa.* In some advanced cases of ariboflavinosis it was observed that the process of seborrhœa had spread to the cheeks, forehead and even to the lobules of the ears. As already mentioned this sign was resistant to ordinary treatment and requires local treatment in the way of rubbing it off with spirit or eau de cologne in addition to oral therapy.

8. *Associated illnesses.* A little more than 50 per cent of the deficiency cases gave history of infectious diseases especially dysentery, diarrhœa and malaria. It appears that these diseases have predisposed some of these deficiencies or actually precipitated these conditions in others. Stool examination in 50 cases showed the causative factor to be Ent. histolytica (vegetative, cystic) or hookworm ova. It is surprising that inspite of all these vitamin deficiencies the plasma protein levels are not disturbed at all.

From the scale of ration given at present in camps it is evident that it can only supply 1317 calories—the

basic requirements only and the diets rich in vitamins are lacking; so in this connection the following is recommended.

Recommendations

Diet: The diet should be immediately supplemented by a fair amount of proteins, green vegetables and an increased ration of fat and carbohydrates given so as to bring the caloric value to the minimum of 3200 calories per head per 24 hours.

To this end the following table is recommended:

Diet item	*Quantity*	*Caloric value*
Atta	6 chhtks.	1,200
Dal	1 „	360
Parched gram ..	1 „	360
Rice	2 „	480
Sugar	1 „	232
Ghee	1 „	200
Milk	1 lb.	320
Fruit and green vegetables	4 chhtks.	50
	Total ..	3,202

Since deficiency in vitamin B complex is the highest so a regular ration of germinated grams, nuts (groundnuts specially as they are rich in nicotinic acid), carrots, spinach, tomatoes, if possible eggs and minced liver be given to these cases.

All these things should be cooked or prepared in deficiency kitchens and distributed amongst these cases in deficiency dining halls where these people should come daily for their one meal if not for both meals because it has been observed that if these cases take these things to their homes from the deficiency outdoor they distribute them to their children and other family members who are not deficient.

Educational broadcast should be given from publicity office explaining the value of various articles of diet and the importance of having nutritious diet should be impressed on their minds.

Nutritional shops in the camp should replace the present stalls dealing with highly spicy foods prepared under unhygienic conditions.

In severe cases of deficiency various types of synthetic vitamin preparations should be given to these cases from the outdoor hospitals. Some people cannot take oleum vitaminata, for them capsules containing vitamins A and D should be given. As most of the cases are suffering from vitamin B complex deficiency, yeast, marmite, liver or other vitamin B rich preparations should be given from the outdoor hospitals.

Finally these deficiency cases should be instructed to attend the Deficiency Outdoor Hospitals regularly because if they do not attend for some time not only there will be danger of losing the effect of treatment but they will present with some added features of deficiency which they are liable to develop from the present partially deficient rations given to them in the camps.

ANTI-ALLERGIC DRUGS IN ACUTE NEPHRITIS

A Preliminary Report

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The enigma of acute nephritis is yet to be solved. But all investigators agreed that an acute infection, specially of the upper respiratory tract—tonsillitis, sore throat, "cold" or influenza precedes the actual attack of nephritis (Ellis 1942). Other infections like pneumonia, empyema, appendicitis, appendix abscess, peritonitis and impetigo may also precede in some cases. In no case, however, does it apear at the height of the primary disease. It always follows the acute infection, in fact, most common period is the period of convalescence, just at the period when the patient is thought to have overcome his primary infection. Not only that, no corelation could be found between the severity of the primary attack and the incidence of acute nephritis. Experimentally also, no nephritis could be produced by injecting the infective material in animals. A lag period must elapse between the infection and the onset of acute nephritis. Hence "it can safely be concluded that the disease is not the simple result of the action of circulating streptococcal toxin on the glomeruli" (Hadfield and Garrod 1947). Hence "the explanation which has found most favour is that acute nephritis is related in some way to a hypersensitive state developed during the acquisition of immunity." (Hadfield and Garrod 1947).

With this theoretical background, various experiments have been set up to show that when rabbits are sensitised by nephrotoxic serum (Masugi, 1933, 1935), further introduction of the sensitising agent produces an acute attack of glomerulonephritis. This work has been amply confirmed by various workers in recent years (Hemprich 1934-35, Weiss 1935-36, Arnott, Kellar and Mathew 1936, Smadel and Farr 1937).

The active agent in such a nephrotoxic serum is an organ-specific antibody and nephritis is regarded as the consequence of an exaggerated antigen-antibody reaction.

Now, if this conception is right, then the newly-discovered anti-allergic drugs should be of benefit in treatment of acute nephritis. We had the occasion of treating one case of acute nephritis by this method with happy results. Hence the case seems to be worth reporting:

Case Report

A male, Hindu child aged 10 years was admitted in Sishu-Sadan for the following complaints:—

1. Swelling of face and limbs with occassional exacerabation—2 months.

2. Scanty high coloured urine—3 months.

3. Irregular fever—1 year.

The patient is the youngest child of his parents and was delivered by a caesarian section. He has three brothers and all of them are in good health. Both the parents are healthy.

Though he was never breast-fed, his growth, both mental and physical was normal.

History of the Present Illness: About 2 months back, he had a sudden rise of fever. This was accompanied by vomiting and pain in the abdomen. This lasted for 2-3 days and gradually disappeared with treatment by simple alkaline mixture. About 15 days after this acute attack of fever, during the period of convalescence, his parents noticed that his face and eye-lids were getting swollen. This gradually extended to the limbs and the whole body.

On Examination: The child was very pale and was bloated all over. His nutrition appeared to be good. The skin was shiny and tightly stretched on the limbs. Both the eyes were almost completely closed.

His pulse was 90/min and respiration 22/min. Temperature was 98·8°F (rectal).

Nothing abnormal was detected in the respiratory system, except general weakness of the breath sound and a few occasional moist sounds here and there. Apex beat was in the 5th left interspace on the mid-clavicular line.

The B. P. was 85/60 mm. of Hg.

Laboratory examination showed:

Urine on admission: Brown in colour, hazy. Sp. gr. 1030. Acid reaction. Albumen—1·4%. Bile pigment—trace. Epithelia—Small round, spindle form, pavement form—present; W.B.C.—present; Pus cells —fair number; R.B.C.—present. Casts—Epithelial, hyaline, and small, granular—present.

Blood showed Hb—52% (Sahli). R.B.C.— 3·48 million per cmm. W.B.C.—12,000 per cmm. Poly—56 per cent. Lymphocytes—44 per cent. M.P.—nil. Abnormal cell—nil.

Stool—nothing abnormal.

Treatment and progress—He was put to bed and his fluid intake and output were measured. He was put on citrated milk and 2-3 oz. or orange juice. His fluid intake was restricted to an amount of maximum 25 oz. His output varied between 5-10 oz. He was given simple alkali and iron mixture. After two weeks, œdema of limbs slightly diminished. After this there was slight fluctuation in oedema. Sometime it was improving a little. But there was no appreciable diminution. The appetite was good throughout. This continued for another fortnight when the patient started diarrhœa and about a week after the condition of the patient turned very bad and he began to refuse food. Within one week the patient became so bad that he could not turn on his bed, and all hope for recovery was given up. At this point of the case, Antistine was started at a dosage schedule of ½ tablet thrice daily. This was continued for three weeks. Within two days of administration of Antistine definite improvement in the condition of the patient started. The diarrhœa was controlled to a great extent and œdema began to subside gradually. Within one week, there was marked improvement of the patient. The stool was formed. Appetite improved and he began to take interest in the surroundings. Next week œdema almost completely subsided. The subsequent recovery was then uneventful.

He was discharged from the hospital about one month after the institution of anti-allergic treatment. He was examined last in December, 1948, when he was found to be in the best of health.

Discussion

The typical attack of swelling, and the urinary findings leave no doubt that this was a case of acute nephritis. Only point against the diagnosis was that the blood pressure was not raised at all. But this finding is quite compatible with an attack of acute nephritis. Most cases of acute nephritis, about 80 per cent in Ellis' series, may be cured spontaneously, so it is very difficult to dogmatise on the therapeutic value of any new drug in these cases. But the result of anti-allergic treatment in this boy was rather dramatic. The drug was administered when all hopes of recovery were given up and the gratifying result obtained was beyond our expectation.

Summary

1. Pathogenesis of acute nephritis with special reference to the allergic theory is discussed.

2. The rationality of employing anti-allergic drugs in this condition is pointed out.

3. A case of acute nephritis in which anti-allergic drug, Antistine, was administered with dramatic results is reported.

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SPECIAL ARTICLES

I

RECENT TRENDS IN PATHOLOGY TEACHING AND HOSPITAL SERVICE

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During my recent tour of the United States, I had the opportunity to study first-hand the organization of the pathology departments of the major universities and to discuss methods of teaching and hospital service with the foremost men in the field. My own views on the subject which are presented here do not coincide exactly with the American ideas, but have been modified to a great extent in the light of the facilities available at the Indian universities.

Karsner[1] defines pathology as a "subject pursued in the laboratory, utilizing all the tools of morphology, mathematics, physics, chemistry, physiology, bacteriology, immunology and the like, to explain the origin, course and nature of abnormal form and function." Today the teaching of pathology no longer consists simply of lectures on morphological pathology. Those who still hold to the view that teaching of this subject should be confined to morphologic methods fail to recognize that each student is a potential investigator, whether he practises medicine or devotes his life to the investigation of disease. As Karsner[2] says, "the so called seclusion of the laboratory often leads one to forget that the living patient as he appears for diagnosis represents a problem in investigation."

It is interesting to note the evolution of pathology from the pathologic anatomy of Rokitansky, through the adoption of procedures of physiology and chemistry by Virchow and Cohnheim, to ultimate incorporation of methods of bacteriology, parasitology and immunology following Pasteur.

The two aspects of departmental activity, teaching of medical students and hospital service, will be considered in two separate papers.

I. Teaching of Medical Students

The teaching of pathology, besides pathologic anatomy should also include pathological physiology, chemical pathology, clinical pathology and finally, the all important correlation of clinical symptoms and structural changes. In addition, the student should be initiated into the methods of experimental pathology. The advantage of including studies of function in the course of pathology is twofold for it makes pathology a living subject, and helps turn out a well rounded graduate. Simply performing an experiment is insufficient,—it must be interpreted so as to demonstrate its application to human disorders.

This does not mean the abandonment of morbid anatomy or its relegation to a second place. Although some like Rous[3] referred to it as "the dried stockfish of the subject," I agree with Karsner[1] when he says "the tutelage of our pupils must be largely devoted to training in this field, which in itself is a place for exercise of skill and judgment, and no one can be called a pathologist unless he is trained, experienced and competent as a morphologist. He cannot adequately perform hospital duties, teach or engage in research without pathologic anatomy. It is not dead, it is living, progressing, and holds much for the future."

Still it cannot be maintained that morphology is all pathology, and as Symers[4] says, "that individual who confines himself to the study of pathologic anatomy without attempting to bring it into harmony with the signs of altered function, is blind in one eye."

More important than any single phase of pathology is the balanced synthesis of material and methods. The rapid advance of pathology in recent times has been due, as Klotz[5] says to "utilizing the principles of chemistry, physics and biology, but wedding none of these to the exclusion of others." As early as 1854, Virchow[6] wrote, "that perception of morbid lesion was not the ultimate object of pathology, that structural alteration was not the imminent reason of disease. The fundamental error lies in the confusion of the anatomic with the material. We also can not conceive of any phenomenon of life, however, functional it may appear, without an alteration of matter; but need it be anatomic, can it not be chemical?" Recognizing the broad scope of pathology as it was conceived by Virchow, we come to a realization of the fact that in the same sense as anatomy is not the science of medicine, so is pathologic anatomy not the science of pathology.

Our primary aim in teaching medical students should not be to produce expert pathologists, but rather good general practitioners equipped to visualise the underlying pathological changes and to fully appreciate the clinical course of the disease. I strongly believe that internists should be provided with facilities to work in a laboratory of pathology for at least six months. A skilled pathologist has a background of unquestioned value in the practice of medicine. With the constant utilization of principles of physiology and chemistry in internal medicine, and the application of immunological methods in the diagnosis and treatment of disease, it is essential for the student to get a proper training in these subjects.

Finally, he must be able to evaluate and interpret the various pathological, bacteriolgical and biochemical tests necessary for making a diagnosis. With this in view, clinico-pathologic correlation should be a major aim in teaching. The idea of teaching pathology should be to make the subject an exposition of causes, processes and results of disease. The student should realize that in pathologic anatomy he is studying only the end results of disease. Those who wish to practise pathology will have to learn advanced pathology as postgraduates working as demonstrators or fellows in the department.

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The curriculum for the undergraduates should be designed to exclude as far as possible, all those items which the student will not require when he begins to practise, although I believe some theoretical material not directly applicable to practice has a place.

The teaching of pathology centers on its relation to the living patient, although many like Richets[7] regard the pathologist as "a savant, whose only object is the discovery of truth." At the dedication of the Pathological Institute at Montreal, Boycott[8] said, "the time has now arrived when pathology must recognize that it is a science which can and ought to stand on its own feet and pursue its own end, which is the study of pathology, not the study of medicine and surgery." He recognized two kinds of pathologists, "those whose real heart is in the clinical application and those who are in pathology because they had it laid upon them to try to know about the reactions of the living things to injury and disease, without any particular direct reference to human welfare." Oertel[9] held the same view. Karsner[1] accurately characterized the attitude of the present generation of pathologists when he wrote, "It can be said with assurance that most of us who give our lives to pathology do so because of the crowning place it occupies in the large field of medicine."

Teaching is divided into lectures, practical classes, pathology and elective courses.

Lectures. Although divergent views are held by some American professors, I regard lectures as an important part of the curriculum. By themselves the number of lectures is insufficient to cover the whole field, but when constantly supplemented by practical classes, autopsies, clinico-pathological conferences and by surgical pathology courses in the fifth year, they prove adequate. The lectures are illustrated as far as possible with kodochromes, photomicrographs, book projections and mounted and unmounted specimens from the museum.

Lectures are delivered mostly by permanent members of the staff, but junior members may be asked to deliver a few lectures on the particular problems in which they are engaged. The schedule of lectures with dates and topics is prepared at the beginning of the session so that the students know in advance and prepare for the subject of each day's lecture. At the end of each lecture, ten minutes are allowed for questions and discussion, while a quiz at the end of the month helps the students evaluate their progress.

Practical Classes. Every effort is made to correlate the practical work with the lectures, and insure continuity of teaching, the laboratory classes are held just after lectures. At the beginning of the class, microscopic sections are projected in the dark room and explained to the students to avoid confusion and give them a general idea what to look for when they study the slide under the microscope. Then the class is divided in half, with one group studying gross anatomy from mounted and unmounted specimens, and the other studying microscopic pathology. The sheets giving the outline of the work to be done are distributed a few days in advance. These also give the brief clinical history of the case from which the tissue has been taken, as well as the gross and microscopic findings. I find it very useful to give the clinical history, because the students can correlate the clinical findings with the gross and microscopic pathology. Students file these sheets and after two years find they have accumulated a valuable and useful collection.

I am still undecided about the utility of insisting that students draw diagrams of histological findings, and have always felt that, compared to the time spent on them, they do not prove useful. Besides, there is always the possibility of the student copying the diagrams from text-books or from the notebooks of fellow students, unless it is stringently insisted that notebooks be deposited in the laboratory and checked every day. Instead of this implied distrust, I would like to have them realize that they have come to us to learn pathology, and while we have given them every opportunity to do so, we cannot force them to learn. In American universities this practice of drawing diagrams was abandoned twenty years ago, and I no longer insist on it at Agra.

The whole class should be divided into small groups with one member of the staff responsible for teaching each group. The rotation of these groups among the entire staff in the course of the year would provide greater opportunity for individual contact between students and staff. No hard and fast rules regarding teaching methods are laid down, and the opportunity for individual organization would be stimulating for the younger men.

The first few classes cover histological technics and stainings. A loan set of slides with corresponding sheets is provided for each student. He is responsble for the slides which must be returned at the end of the year. It would be ideal to give them slides permanently, but if they are expected to study an appreciable number of them, it would entail technical help which is not available at present. Besides, with the present scarcity of post mortem material, it would be almost impossible to find fresh material every year from which to cut sections. Even in the U.S.A., with the single exception of the University of Chicago, the departments provide only loan sets.

Clinical pathology and hematology should be taught by resident clinical pathologists in the central inpatient and outpatient laboratories. Dividing the class into groups of ten, with each group attending one of these laboratories twice a week would provide the students with opportunities to do examinations of blood, urine, feces, smears etc. Moreover, they come in direct contact with the patient and visit the ward with the resident pathologist, collecting samples of blood etc. In the outpatient laboratory, students should be assigned cases sent for various pathological examinations. While working as clinical clerks in the hospital they should be required to carry out all the routine preliminary pathological examinations on their own patients. These findings should be countersigned by the resident pathologist before they are accepted by the medical and surgical staff. In American universities clinical pathology is often taught by the department of medicine.

At Agra, teaching of chemical pathology consists of demonstrations given in conjunction with the department of biochemistry. After a few years trial, I have come to the conclusion that it is a waste of an undergraduate's time to ask him to learn the technic of these complicated processes, because he will have to take post graduate training in this field if he intends to practise chemical pathology. The department of biochemistry should incorporate the teaching of chemical technics in its curriculum for the second year students.

The practical classes in bacteriology and parasitology modelled on similar lines, are held in the third year, while in the fourth year a short course in advanced bacteriology including immunology and serology is given. The students are required to study the common bacteria and make cultures on routine media. Depending on the facilities available, the students are required either to perform or to observe demonstrations of laboratory diagnostic methods of the corresponding bacterial infections. In parasitology, the students study the parasites, their ova, the laboratory diagnostic aids, and the gross and microscopic lesions caused by them. Each student is given a complete outline of bacterial study which he is expected to follow as the study of the bacteria proceeds.

Seminars. In the fortnightly seminars, which are designed to familiarize students with methods of research through the study of source material, students present papers on any subject on their choice which has been approved by the staff. They are expected to go through the available literature on the subject, summarizing the material and giving the present concept. All too often one finds that medical students do not know how to use a library and it is very interesting to watch them learn to use the Quarterly Cumulative Index Medicus and abstract journals, gradually developing research habits. All along the student is guided by one member of the staff to whom he has been assigned for this purpose. The high standard of these papers and the wealth of material they contain frequently offer stimulating ideas for original work. Thirty minutes are allowed for the presentation of the paper followed by a thirty minute discussion period in which both students and staff participate. It would profit the department to bind these papers and file them permanently for future reference since they contain fairly complete bibliographies.

Even though the university examinations are held at the end of the fourth year, the teaching of pathology should be continued in the final year in the form of clinicopathological conferences and a course in surgical pathology.

Clinico-Pathological Conferences. These conferences are held once a week and are intended primarily for final year students, although third and fourth year students are expected to attend. These conferences will replace the applied pathology clinics at Agra, and will be conducted primarily by the students themselves. The student in charge of the case presents the patient with the clinical history, laboratory and radiological findings. He then discusses the clinical interpretation of these findings and justifies the clinical diagnosis. Following the discussion of the presentation, an attempt is made to correlate symptons and morphologic disturbances. This case presentation may be substituted by the discussion of an autopsy if available. Here the students of the fifth year class may be required to present the history and differential diagnosis of a case which has recently come to autopsy. Following this presentation, the organs from the patient are demonstrated by two fourth year students. This is succeeded by an atempt at clinico-pathological correlation and a discussion of the source of error in clinical diagnosis. The students, who have received advance notice of the case, come prepared to discuss it intelligently. From my own experience in attending these conferences at the American colleges, I feel that it would be a definite improvement on our existing methods of teaching applied pathology.

Surgical Pathology. Classes in surgical pathology are held twice a week for two hours, for surgcal clerks of the final year. In case all the final year students do not rotate round the surgical department, they are divided in two sections, each section attending classes for a term and a half. In the first hour the current surgicals with their clinical histories, gross and microscopic findings, are discussed. The students examine the specimens and study the sections on which the histological diagnosis was based. This becomes interesting in view of the fact that the clerks had been following these cases since admission and had attended the operations. In the second hour, some previously assigned system is discussed, gross anatomy demonstrated and slides studied. This system is on the lines of surgical pathology teaching at Columbia University and is decidedly a better method than the older system, where the students were taken round the museum, shown the mounted specimens and subjected to a harangue, with no opportunity to study the histology. Another method of teaching surgical pathology which I thought very instructive, is the one used at Tulane and Johns Hopkins Universities. Here a senior member of the surgical staff is invited to these classes to discuss the clinical aspects of the case, while the pathologist demonstrates the gross and microscopical findings in the organs. The students are given a loan set of slides and they study the sections microscopically together with the pathologist and the surgeon. Both systems are good, but personally I prefer the former, simply because it makes a lasting impression on the clerks who have been following the case since admision and who are anxious to know how the surgically removed organ looks in the gross as well as under the microscope.

Autopsy. The situation of autopsies in India is very unsatisfactory. In American hospitals, where permission of the nearest relative must be obtained before an autopsy can be performed, an average of fifty to sixty per cent dying in the hospital are autopsied. This accounts for two hundred and fifty to fourteen hundred autopsies per year in the various teaching hospitals. Compared with these, our figures are very poor. The burden for getting permission for autopsy rests on the clinical staff, and until they realize that an autopsy on their patient is of as much value to them as to the pathologist, the present state will con-

tinue. This is a great handicap to our teaching of morbid anatomy. It becomes very difficult to get representative material for practical classes, the students are denied oportunity to study gross pathology, the staff have very little to work upon, and the museum starves.

The older method of requiring each third and fourth year student to be present in the post mortem room at the time of autopsy may well be discarded. Only the few near the table are able to see the post mortem and for the rest, it is merely a waste of time. A maximum of eight students should be assigned to each autopsy, and these should be expected to assist in its performance.

Although I would prefer to perform each autopsy myself, I feel that each member of the staff should have a chance to do it, since the autopsy is the most important means of learning gross pathology. However, it is essential that the gross should be checked by a senior member of the staff. The person who performs the autopsy is responsible for writing up the protocol, discussing the post mortem with the class, and demonstrating at the gross conference to which the clinical staff may also be invited. Each student is expected to make brief notes on special sheets and write a comprehensive protocol in a special notebook. After the sections are ready, the microscopic findings are discussed with the students in special clinico-pathological conferences. When the students have completed their protocols, summarized the clinical, anatomical and microscopic findings, and discussed their correlation, the books are checked by the staff.

All important lesions should be photographed in color or black and white for demonstration at the staff conferences and lectures. An up to date photographic department equipped for gross as well as photo-micrography, is essential both for permanent recording of interesting cases and for publication of original papers by the staff members.

Elective Courses. Many universities in the States offer elective courses in all branches of medicine primarily for senior students whose special ability or interest warrant more experience in a particular subject. For example, in pathology and bacteriology, a few selected students with special aptitude, or who propose ultimately to practise pathology, should be given an elective course. At least two hours a week should be set aside in the college curriculum for such a course, when the student may work in any department of his choice. House officers may also be taken depending on the space and equipment available. Material for study in pathology should be in the form of gross specimens and microscopic slides, and for bacteriology, blood specimens, urine, feces, pus, spinal fluid, swabs, etc. Complete records and reports should be required. Opportunity should also be afforded to those suitably trained to assist in investigations being conducted by members of the staff, or even to pursue advanced work or specialized research of their own in pathological anatomy or experimental pathology.

Education of Demonstrators and Fellows. This aspect of departmental activity is very much neglected in the Indian colleges where there is a tendency to regard these officers as members of the department with definite assigned duties. However, these young men and women joined the department for a limited time, not to earn money, but to learn advanced pathology, carry on research, and work on their doctoral thesis. They should be given all possible encouragement and the time and equipment for carrying on research. They should be rotated round the histo-pathological, bacteriological, chemical and clinical pathological laboratories every six months, and held responsible for routine work. For example, in the surgical pathology laboratory, they should examine and describe the daily surgical specimens and study the microscopic sections before the diagnosis is given by the professor. They should perform autopsies and write up protocols, presenting them in departmental conferences. In addition to practical teaching, they may be asked to give one or two lectures on the special problems in which they are interested.

A departmental conference should be held once a week, when the current week's autopsies and interesting surgicals may be discussed. Once a month a paper may be presented by a staff member, usually on his own research project, with the view of inviting discussion, criticism and valuable suggestions.

The above program, combined with attendance at the surgical and medical pathological conferences, should provide ample opportunities for post graduate education.

Pathology Museum. My views on the nature of the pathology museum are fully presented in the preface to the "Descriptive Catalog of the Specimens contained in the Agra Medical College Museum" (Wahi[10]). A good museum containing mounted and unmounted specimens, microscopic slides, photo-micrographs of the representative findings, clinical histories, and the bibliography of the particular disease, is a definite asset. To maintain such a museum, a separate staff would be necessary. This, plus the constant changing of preservatives and glass jars, entail expenditure which would be beyond the means of many colleges.

However, I am inclined to be skeptical about the teaching value of such a museum. If I were given the choice, I would spend the money on the maintenance of a good photographic department, and make a collection of kodochromes and black and white pictures of the gross as well as the microscopic findings. When projected in the class room these make the lectures more interesting and instructive than simply showing the mounted specimens.

Finally, I would like to summarize the various courses which I believe are requisite for the present day teaching of pathology, and which are given at present, or will soon be added to the curriculum at the Agra Medical College.

I. *Pathological anatomy and physiology.* Third and fourth year students—lectures 100 hours, laboratory work 200 hours.

Systematic lectures and demonstrations on gross morbid anatomy are given to the whole class throughout two years. For practical training the class is divided into relatively small groups, each of which is

assigned to two members of the staff. The students study the gross material, the corresponding microscopic preparations and the clinical histories. While this course forms the necessary framework upon which the student will rely, every opportunity is utilized to familiarize him with the great mass of current, fresh material.

Throughout the course, stress is laid upon the correlation between the lesion and the associated functional changes as evinced by signs and symptons. Besides this, a course of ten lectures is given to the second year student as an introduction to clinical subjects.

II. *Introductory and diagnostic bacteriology.* Third and fourth year students.

Third year students are given systematic lectures and demonstrations in bacteriology. Except for a few introductory exercises, *e.g.*, making of media, methods of sterilization and the development of bacteriologic technic, during which non-pathogenic bacteria are studied, the course consists mostly of the study of pathogenic bacteria and fungi. Diagnostic bacteriology and immunology is treated with the study of individual micro-organisms. The course in serology consists in the study of serological procedures employed in diagnosis and treatment, *e.g.*, agglutination, precipitation, complement-fixation, anti-bacterial and antitoxic reactions. It would be desirable to give elective courses in advanced serology, *e.g.*, production of antisera in animals.

III. *Clinico-pathological conferences.* Fifth year students.

The clinical course and differential diagnosis of recent cases are correlated with the underlying pathologic lesions. Third and fourth year students are also expected to attend.

IV. *Seminars.* Third and fourth year students.

Twice a month students present papers, and opportunity is afforded to the entire class to participate in the discussion.

V. *Surgical pathology.* Fifth year students.

Besides the gross and microscopic demonstration of material removed at operation from patients who have been observed by the students in the wards and operating rooms, the group studies systematically, cases illustrating diseases of the breast, lymph nodes, spleen, digestive tract, nervous system, respiratory system, bones, skin, male and female genito-urinary tracts.

VI. *Autopsies.* Third and fourth year students.

Students in groups are called upon to assist in the performance of autopsies and write proper protocols. The gross, with the clinical history, is demonstrated to the entire class by these students. After microscopic and bacteriological studies are completed, they are finally reviewed in a conference with the entire group. This forms an excellent basis for case teaching.

VII. *Elective course.* Fourth year students.

Opportunity is afforded to a few selected students with special aptitude to assist in research in pathological anatomy or experimental pathology, or to pursue advanced work.

(To be concluded)

II

THE FUTURE OF MEDICAL EDUCATION IN INDIA

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(Continued from the previous issue)

Preclinical Course

After a student has been well conversant with the basic principles and methods of hygiene and general sciences as a part of his school education over a period of years and after a premedical course of two years in biology, physics, chemistry, botany and probably mathematics he should be allowed to enter into the professional education. The first two years is to be spent in what is called the preclinical course, the principal subjects of study being Anatomy and Physiology. As the teaching is carried out at present the student is required to absorb, under considerable pressure, masses of factual and largely unrelated information in the above two fields.

The principle to be followed is to shorten the course of dissection without sacrifice of essentials and avoidance of detailed information for general students. It should refer frequently to its association to clinical studies, preventive aspect, normal health conditions such as child development and its standard, study of growth, effects of exercise and physical training, and standards of physical fitness, injuries and first aid measures and so on, which should make liveliest appeal to them and keep up their continuous interest.

Likewise in Physiology, more time should be spent on the range of normal human function and the standard of health conditions, studies on food and nutrition, balanced diet, maternal, infant and child nutrition and development, broad studies on metabolism, biochemistry, body resistance and so on with frequent reference to the clinical conditions and preventive aspects. As a matter of fact, the curriculum of Physiology studies should include more about health promotion and disease prevention than with problems of human morbidity, and a closer liaison between the medical and related service departments *e.g.*, between biochemistry and chemistry, between physiology and anatomy and biology, between anatomy and anthropology or zoology and so on, should be maintained.

Not only do research projects benefit from multiple co-ordinated approaches, but an occasional interchange of lectures between such related department might prove refreshing to all concerned. A short course of lectures could thus fittingly be given in (1) certain aspects of eugenics, anthropology and ethnology (2) Mass psychology. (3) Elementary statistics. (4) Political economy, government and citizenship (early course of social medicine). In fact, these lectures will be received as a sort of recreation by the students. The

details of the curriculum may be worked out according to the recommendation of the Medical Research Council of U.K. and besides Anatomy and Physiology elements of Psychology should be included in the regular curriculum.

(1) *Eugenics, Anthropology and Ethnology.*—No one can deny age, sex, race and genetical make up of an individual or individuals constituting a community as factors influencing their behaviour upon health and susceptibility to or resistance against disease. Certain basic knowledge about genetics, anthropology and ethnology is therefore necessary to fully understand their implications in the practice of the science of medicine, particularly its social and preventive aspects. Elements of genetics may actually be incorporated with Human Physiology.

(2) *Mass Psychology.*—Dealing with patients in the first months of general practice is an important event in the professional life of every medical man. It will be more so in the future public health practice in which the doctor has to deal with mass psychology. It is important for the student to understand the patient's psychology and temperament as well as the social and economic factors in his back ground. So, the medical students should be brought at an early stage in his career into relation with patients in the outdoor and casualty blocks as dresser and in the patients' home on follow up visits with the hospital social workers.

(3) *Elementary Statistics*—The statistical approach which is the key note for a scientific approach is essential for all scientific work. All students of social and natural sciences should therefore be familiar with the quantitative evaluation and the common statistical methods as a part of the background of their knowledge. In the preclinical course it is suggested that a short elementary course requiring no special mathematical ability but designed to familiarise students with statistical ideas and the most commonly used elementary methods should be arranged, *e.g.*, probability of happening, averages, made, median, normal curve, standard deviation, standard error, measurement of height and weight of different sex and age groups and so on.

(4) *Political Economy, Government and Citizenship.*—As a preliminary to the course on Social Medicine which can be started during the earlier part of the clinical studies, a few lectures (10-12) on Political Economy, our Government, Society and Citizenship will create a background upon which the knowledge on Social Medicine can later be built. In fact, this course should be given as a part of general education.

Transitional Period

Both the Goodenough Committee and the British General Medical Council have recommended a period of three months to be devoted to (1) Introductory Clinical Course, (2) Elements of Pathology and Bacteriology and (3) Elements of Pharmacology, before the students actually begin their clinical studies. The aims of such a course are: (i) to help the students in their adjustments to the new conditions of work and study; (ii) to show them the relation to clinical studies of their earlier study of human body and its functioning in health; (iii) to encourage them to carry methods of scientific thought and criticism into clinical work; and (iv) to assist them to acquire without loss of time, the ability to observe and interpret physical signs of disease. The last purpose can be better fulfilled by introducing history of evolution of medical thoughts during this period. The writer's specific suggestion in therefore as follows:

Before the 'clinical studies' a period of three months should be spent for (1) Introductory clinical course in which will be included the elements of pathology & bacteriology and of pharmacology as are necessary to supplement the clinical methods and (2) History of Medicine.

Clinical Studies

In view of the changed outlook already mentioned the curriculum of studies of major medical subjects should be so adjusted that the unnecessary burden of learning the ever increasing details of facts collected in course of time with regard to the various diseases is eliminated reducing them only to the essentials due regard being paid to the question what amount of introduction in any given subject is indispensable for maintaining the standard of the qualifying examination. The curriculum should, on the other hand, cover the newer fields of social and preventive medicine with special emphasis on these diseases and conditions which are still menacing our country. There is, however, no suggestion that clinical medicine (including surgery) should be displaced from its honoured and fundamental position in the professional training of all doctors.

Clinical studies should be distributed over a period of 33 months. With 3 months spent for the 'Introductory clinical course' the total period comes up to 3 years. The broad division of subjects suggested is as follows: (see Tables).

1. *Pathology and Microbiology.*—The subject of Pathology has three distinct parts *viz.*, (1) General (2) Special (in reference to specific diseases)—(a) including postmortem studies. (b) medical (c) surgical; and (3) clinical and chemical pathology, most of which is taken up during the introductory clinical course. The medical and surgical pathologies will form part of instruction in medicine and surgery and will be included in the general papers on these subjects for the purpose of examination.

Microbiology will have six sections *viz.*, (1) General Bacteriology including viruses as related to clinical medicine, (2) Theoretical and Applied Immunology; (3) Protozoology; (4) Helminthology; (5) Elementary Entomology and (6) Clinical Microbiology most of which will mainly come under the instruction given in the 'Introductory clinical course'. All throughout the course the preventive aspect must be simultaneously stresed at every step.

2. *Pharmacology and Therapeutics.* (including elementary Pharmocognosy)—Instructions on Pharmacology will begin with the 'introductory clinical course' by demonstrating the drug action on the normal organism and so on. This will be supplemented by the practical course on elementary pharmacognosy and pharmacy. Instructions in Therapeutics including the prescribing hints will better be shared between the Professor of Pharmacology and Professors of Medicine, Pediatrics, Surgery and so on. The questions on Therapeutics should be set along with the respective major subjects. Pharmacognosy as a part of Pharmacology may be reserved for specialisation during post graduate studies.

The above two branches should be examined at the end of the 3rd year course.

3. *Medical Jurisprudence and Toxicology.*—It is suggested that the teaching of this subject should be completed by the end of the 4th year of studies (*i.e.*, the second year of clinical studies), when the examination should also be held. This arrangement will leave only 4 major subjects for the Final Qualifying Examination *viz.*, Medicine, Surgery, Obstetrics, and Gynecology and Social & Preventive Medicine, the other subjects being incorporated as separate papers in the appropriate sections of the major subjects.

4. Medicine.—No distinction is necessary between medicine and clinical medicine. Pediatrics and Psychiatry are to be treated as separate branches. In teaching the principle of cutting off of unnecessary details and emphasising on the preventive aspect should be followed. For instance, tropical disease like malaria, K. A., Diarrhoea and Dysentery, Cholera, Helminthic Infections, should receive special attention and so also Tuberculosis, Leprosy and Skin Disease which are problems in our country. The programme of studies approved by the G.M.C. may be essentially followed with certain medifications, *viz.*, for Venereal Diseases, Radiology and Physiotherapy a coordinated lecture course with Professors of Surgery and Radiology and for cardiology with Prefessor of Physiology may be arranged; and instead of 6 months as proposed by the G.M.C. a period of 14 months may be alloted for hospital, outdoor and other medical ward duties.

5. *Surgery*—Like Medicine no distinction should be made between general and clinical surgery. The teaching principles should be the same as in Medicine. A general working knowledge on diagnosis and principles of treatment of sufficient knowledge to ensure familiarity with common surgical conditions, their recognition and treatment. The higher knowledge should be left out for post-graduate studies. The curriculum recommended by the G.M.C. may be principally followed with certain changes *viz.*, the surgical part of Venereology, Radiotherapy and Physiotherapy may be included in the coordinated course as proposed in the case of medical part and the practical instruction in minor operative surgery on the living may also include the emergency operative sugery; a period of 12 months may be alloted for hospital and outdoor surgical ward duties.

6. *Obstetrics and Gynecology.*—The most important medical relief as well as preventive procedures which are required to be exercised by a trained medical man, wherever he is placed, is the attendance for safe delivery and natal, antenatal and postnatal cares and infant hygiene. This has priority demand through training programme although difficult midwifery and higher gynæcological practices, particularly the operative procedures, may be left for specialisation and post-graduate studies. While the curriculum suggested by the G.M.C. may be essentially followed, one specific suggestion is that the students should spend a specified time for attending a maternity and child welfare clinic where they should be acquainted with the antenatal and postnatal cares given under the existing conditions and some house visiting should be arranged in the rural as well as urban areas to acquaint them with the realities of the situation in actual practice. This can be easily arranged if the university maintains a controlled community field and the department of hospital social service, discussed later.

The instruction should also include the following besides what have been recommended by the G.M C.

(1) Such historical aspects of the subject as the origin and development of concern with maternal morbidity and mortality as a problem of public interest and of measures directed to its reduction.

(2) A short elementary account of the development of the medical and social services and of other relations to the social structure (this part may be given as a part of social medicine).

For practical training in the conduction of labour the recommendation of the I.M.C. may be adhered to (*i.e.*, 20 labour cases to be attended by each student) if difficulties do not arise on account of the double shift or larger number of new admissions.

7. *Pediatrics or Child Health*—The mortality among the infants and pre-school children in our country is alarmingly high. But the protection of children is vital to the future of the nation and the raising of the standard of child health is the best means of securing a general improvement in the health of the community. This subject should therefore receive better and fuller attention in the new curriculum which is more conveniently possible if it is considered as a separate subject. For adequate training on the subject the instruction should also include: (a) historical aspect of the origin and development of the subject as a problem of public interest and of measures directed to its solution; (b) nutrition and development of normal healthy children; (c) care of the newborn and the method of rearing them up; (d) practical training for sometime in the child welfare clinics—both urban and rural, where the students will come in contact with both healthy and sick children in their social and environmental background influencing their growth and development; (e) child psychology (see Psychiatry). Thus, more emphasis will be laid on the prevention of illness and maintenance of health than on sickness.

Except the first two items the rest can be coordinated with teaching of "Maternity & Child Welfare."

TABLE I

MEDICAL EDUCATION
CURRICULUM TABLE FOR BASIC DOCTORS

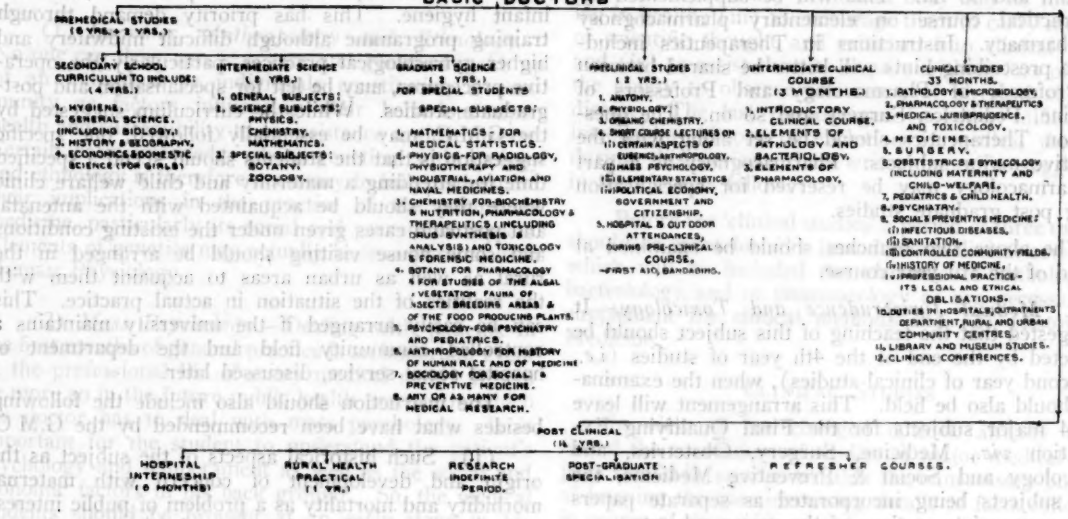
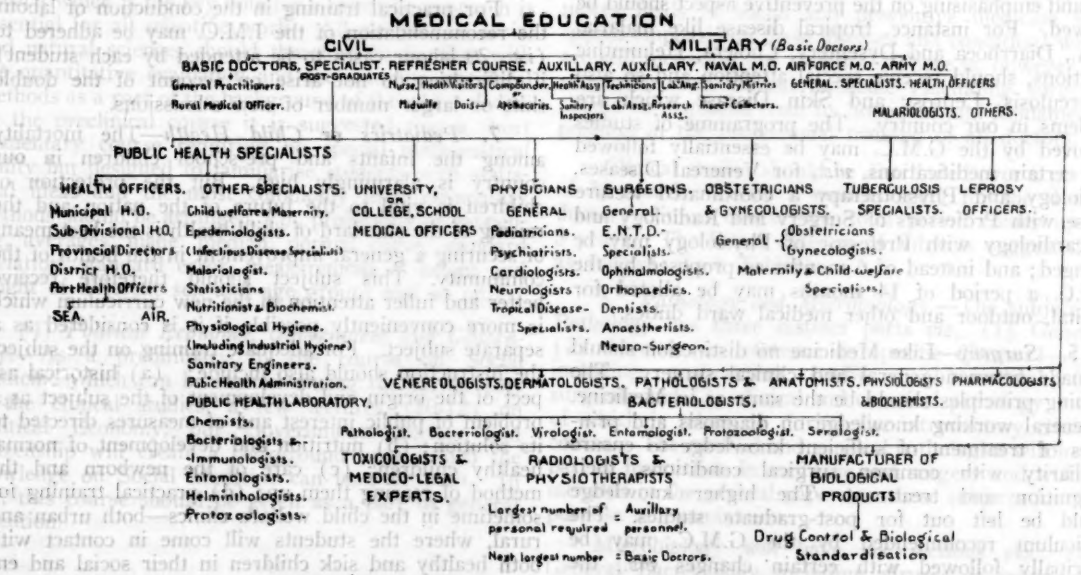

PREMEDICAL STUDIES (6 YRS. + 2 YRS.)
SECONDARY SCHOOL CURRICULUM TO INCLUDE: (4 YRS.)
1. HYGIENE.
2. GENERAL SCIENCE. (INCLUDING BIOLOGY.)
3. HISTORY & GEOGRAPHY.
4. ECONOMICS & DOMESTIC SCIENCE (FOR GIRLS)
INTERMEDIATE SCIENCE (2 YRS.)
1. GENERAL SUBJECTS:
2. SCIENCE SUBJECTS: PHYSICS. CHEMISTRY. MATHEMATICS.
3. SPECIAL SUBJECTS: BOTANY. ZOOLOGY.
GRADUATE SCIENCE (2 YRS.) FOR SPECIAL STUDENTS
SPECIAL SUBJECTS:
1. MATHEMATICS - FOR MEDICAL STATISTICS.
2. PHYSICS - FOR RADIOLOGY, PHYSIOTHERAPY AND INDUSTRIAL, AVIATION AND NAVAL MEDICINES.
3. CHEMISTRY FOR BIOCHEMISTRY & NUTRITION, PHARMACOLOGY & THERAPEUTICS (INCLUDING DRUG SYNTHESIS & ANALYSIS) AND TOXICOLOGY & FORENSIC MEDICINE.
4. BOTANY FOR PHARMACOLOGY & FOR STUDIES OF THE ALGAL + VEGETATION FAUNA OF INSECTS BREEDING AREAS & OF THE FOOD PRODUCING PLANTS.
5. PSYCHOLOGY - FOR PSYCHIATRY AND PEDIATRICS.
6. ANTHROPOLOGY FOR HISTORY OF HUMAN RACE AND OF MEDICINE
7. SOCIOLOGY FOR SOCIAL & PREVENTIVE MEDICINE.
8. ANY OR AS MANY FOR MEDICAL RESEARCH.
PRECLINICAL STUDIES (2 YRS.)
1. ANATOMY.
2. PHYSIOLOGY.
3. ORGANIC CHEMISTRY.
4. SHORT COURSE LECTURES ON (i) CERTAIN ASPECTS OF EUGENICS, ANTHROPOLOGY. (ii) MASS PSYCHOLOGY, (iii) ELEMENTARY STATISTICS (iv) POLITICAL ECONOMY, GOVERNMENT AND CITIZENSHIP.
5. HOSPITAL & OUT DOOR ATTENDANCE, DURING PRE-CLINICAL COURSE. - FIRST AID, BANDAGING.
INTERMEDIATE CLINICAL COURSE (3 MONTHS.)
1. INTRODUCTORY CLINICAL COURSE.
2. ELEMENTS OF PATHOLOGY AND BACTERIOLOGY.
3. ELEMENTS OF PHARMACOLOGY.
CLINICAL STUDIES 33 MONTHS.
1. PATHOLOGY & MICROBIOLOGY.
2. PHARMACOLOGY & THERAPEUTICS
3. MEDICAL JURISPRUDENCE. AND TOXICOLOGY.
4. MEDICINE.
5. SURGERY.
6. OBSTETRICS & GYNECOLOGY (INCLUDING MATERNITY AND CHILD-WELFARE.
7. PEDIATRICS & CHILD HEALTH.
8. PSYCHIATRY.
9. SOCIAL & PREVENTIVE MEDICINE: (i) INFECTIOUS DISEASES. (ii) SANITATION. (iii) CONTROLLED COMMUNITY FIELDS. (iv) HISTORY OF MEDICINE. (v) PROFESSIONAL PRACTICE - ITS LEGAL AND ETHICAL OBLIGATIONS.
10. DUTIES IN HOSPITALS, OUTPATIENTS DEPARTMENT, RURAL AND URBAN COMMUNITY CENTRES.
11. LIBRARY AND MUSEUM STUDIES.
12. CLINICAL CONFERENCES.
POST CLINICAL (1½ YRS.)
HOSPITAL INTERNESHIP (6 MONTHS)
RURAL HEALTH PRACTICAL (1 YR.)
RESEARCH INDEFINITE PERIOD.
POST-GRADUATE SPECIALISATION
REFRESHER COURSES.

TABLE II

MEDICAL EDUCATION



RESEARCH IN EVERY BRANCH

8. *Psychiatry.*—This subject is also a part of Medicine in the wider sense of the term and is not at present limited to the study of major and minor psychoneuroses and gross mental disorders but also of the wide psychological factors involved in the causation of disorder. The understanding of the psychological background of persons and patients is of as much help to the doctor as his knowledge of Medicine in dealing with the problems of health or sickness. He should possess adequate knowledge and training to enable him to give sound and useful advice on the social, industrial, eugenic, sexual and other aspects of preventive psychiatry about which, many patients will consult him.

To give a good training in Psychiatry arrangements should be made in all medical colleges to provide for an active department of Psychiatry, the work and teaching of which are interwoven with the work and teaching of other departments. Among the instruction in the subject should be included (a) Child Psychology (including mental deficiency and mental disorders) and *preventive* psychiatry (potential disorders of mind). (b) Elementary Experimental Psychology—Its importance in industrial hygiene; psycho-analytical procedures. (c) Mass Psychology—as a part of Social Medicine.

The Goodenough Committee have emphasized that in the teaching of Psychiatry not only the specialists but the other clinicians of the teaching centre have also important obligations by directing the attention of the students to the existence of the mental factors in the ordinary course of teaching and by enlisting the help of the psychiatrist whenever his advice seems desirable. Besides, during the entire course of training the students' attention should be continuously directed by his teachers to the importance of interrelation of physicial and psychological aspects of disease.

9. *Social and Preventive Medicine.*—"Social Medicine is not a new idea but the time has certainly come for it to develop a new discipline. It must come to influence medical teaching, research and practice in many new ways. It must create belief in new and wider responsibilities for every doctor and, whether in remedial or preventive practice (which can no longer remain so sharply separated), for his allies, including the statistician and the scientist, the nurse, the social worker, the health visitor, the midwife and the sanitary officer."—John Ryle.

The above comment of Professor Ryle of the Oxford University shows the modern trend of Medicine and the importance of developing the department of social and preventive medicine. The whole medical curriculum should be permeated with preventive and social outlook. It should be closely linked with the National Health Service or with the University (if it is established) through which observation can be made by the student, and the data analysed, on that important problem, for instance, the respective values of immunization programme and the isolation of contacts as means of controlling outbreaks of certain communicable diseases, the effect of diet, sleep and exercise upon growth and general well-being, the possible relationship between anthropometric findings and diathesis, racial or national origin, and other factors.

The Introduction of Social & Preventive Medicine should be supplemented by a course of some 40 hours or more of theoretical instruction and at least of one month's field experience in the penultimate undergraduate year.

On the Preventive Medicine side the lectures should include principles and methods of sanitation, main principles and techniques of Physiological and Industrial Hygiene with emphasis on health promotion and prevention of ill-health and accidents, basic elements of Epidemiology and Hometrics, the nature diagnosis and control of the more prevalent communicable diseases, childwelfare and maternity service, current public health problems or potential national imports, and finally on public health legislation, administration and organisation with the corresponding practical and necessary field exercises.

Infectious diseases—The main scourge of our country still being the frequent occurrence of epidemics and high incidence of communicable diseases, special emphasis should be laid for the training on this branch of Medicine, not only because a good knowledge of the diseases concerned is essential for the general practitioners who are primarily called in to handle the early cases (and all cases in the rural areas) but also because they offer a fruitful field for teaching both preventive and curative medicine. Unfortunately, the training at present given on the subject falls far short of what is necessary, because in many institutions in India the scope and facilities provided are too limited. More weekly visits for a short duration to the infectious diseases hospital, as is usually arranged, cannot have the desired effect. Students should be actually deputed in the wards as clinical clerks for at least 2-4 weeks.

On the Social side the lectures should include the discussion on the anatomy, physiology and disorders of society, medicine in society, social problems of health and the philosophy of health, clinical case-conferences in hospitals in collaboration with clinical teachers to deal with the social and preventive aspects, supplemented by arrangement for actual field visits to the city and village homes of patients, factories, school etc.,** The department may have certain investigations running which may also be used for demonstration; for instance, anthropometric and socio-economic studies of a particular community, health of preschool or school children, sickness absenteeism in factories or school, investigation into a particular disease prevalance and so on, may be undertaken.

Preventive routines in the hospital and outdoor are to be put under a special officer from the department detailed specifically for the hospital to supervise the case and the students' routine, and he shall present two aspects of diagnosis to them *viz.*, (i) as to the clinical condition, and (ii) as to the social-etiological

** Hospital social service on the same lines as in the U. K. may be introduced.

factors togther with, in each instance, the indicated therapeutic or preventive recommendations. Diagnosis and therapy are then to be commented upon by the clinician and the special preventive officer.

Provision of a controlled community fields.—For the purpose of developing and maintaining the functions of the Department of Social & Preventive Medicine it is necessary to provide both urban and rural community fields for investigation and teaching, analogous to the provision of laboratories to the preclinical students. Social Medicine is so intimately integrated with organised community effort for maintaining health, preventing illness and curing disease through public organisation and administration that reoriented 'basic' doctors should receive instruction in the collectively organised community aspects of public health through participative experience under supervision.

The importance of field studies and field training.—Most of the basic problems of public health that confront our country at present relate to the rural areas and field studies. Let us take any problem—malaria. K. A., diarrhoea and dysentery, cholera, hookworm, tuberculosis, leprosy, malnutrition, sanitation, housing etc., these have long gone beyond the scope of simple laboratory or hospital researches. This is one of the reasons for which at least one year's compulsory internership or employment of the 'basic' doctor in a rural centre has been suggested.

History of Medicine.—The study of the History of Medicine—Indian, Asiatic and of the World, will form an important part of the duties of the Department of Social & Preventive Medicine. Students should receive a series of lectures on the history of medicine with special reference to Public Health and Preventive Medicine, preceded by a short course on the History of Evolution and the History of the World. This method will be found to have a signal effect on the minds of the students for the orientation of proper outlook towards the medical science.

Professional practice—its legal and ethical obligations:

One of the functions of the Social & Preventive Medicine section is to acquaint the students with the legal and ethical obligations of medical practice. Though most of the students are expected to take up medical practice as a profession there is no provision of any instruction in the subject in the course of studies. Every one is therefore required to build up his own practice from his personal experience gained by trial and error during the first few years, whereas the hospital duties and internership which have not yet been made compulsory here, do not give the internee any real idea about professional field practice. And the most important of all is their complete ignorance of the legal responsibilities and the associated ethical manners in regard to the *State* and the *People*. This is considered as a glaring drawback of our present-day medical education and is the most important cause of want of public responsibilities in the discharge of their duties of citizenship in the matter of control and prevention of communicable diseases. This branch of instruction should therefore be introduced and should be logically taken up by the department of Social Preventive Medicine.

Other important functions of the department should be to give leadership in all matters pertaining to the prevention of disease, the promotion of health, preparation and scrutinization of health service schemes or research and the analysis and assessment of the results obtained. A fuller consideration of the details of the curriculum of this new section can only be taken up in a separate communication.

Social, preventive and curative medicines must in time become a unity; but until this new philosophy is accepted and the books on medicine are entirely re-written it will be necessary to have a department, staff and curriculum in social medicine in order to integrate and stimulate work in this important subject. The vast field for research in social medicine need an army of specially trained research workers to tackle many new problems of this branch of medicine in the immediate future.

Students' Duty Roster for Hospitals, Out-patients' Department and the Rural and Urban Community Centres.—For the students' practical training in the indoor and out-patients' department of the hospital and in the proposed rural and urban community centres including those for the maternity and child welfare, the period of 33 months may be divided as follows: (1) Medicine—14 months—inclusive of Indoor, Outdoor, Eye, E.N.T.D., Dental, Venereal, Radiology & Physiotherapy; (3) Obstetrics & Gynecology—7 months—inclusive of Indoor, Outdoor, Labour, Maternity & Child welfare clinics. The duties in the Emergency wards, both surgical and medical, will run concurrently with the indoor ward duties in the respective subjects.

Hospital Facilities and Staff Requirement

Apart from the rural and urban community practice fields adequate provision should be made for the various hospital facilities, stated above. The proportion of number of beds under different categories, to the number of students admitted each year into the clinical course is important for efficient teaching. The Goodenough Committee have recommended that excluding the beds for patients suffering from tuberculosis, acute infectious diseases, mental diseases and other highly specialised conditions, a medical school admitting 100 students a year should have access to between 950 to 1000 beds (*i.e.*, 1:10) for teaching purposes (including facilities for research by the staff). In India, faced as she is with a great demand for a large number of trained medical personnel an average of 7-8 hospital beds per student of clinical course may be accepted as the standard but even then, the problem of grouping of hospitals for the purpose may be somewhat difficult to solve satisfactorily.

The other important question in this connection is the proportion of teachers including professors, assistant professors, demonstrators, hospital visiting and house staff, to the total numbers of students in an institution. An analysis of staff position in different medical institutions in Great Britain gives us a propor-

tion varying from 1: 6 to 1: 25 depending mainly on the subject. The Goodenough Committee have, however, recommended that the number of students for which one teacher is responsible should be limited to between 6 and 8. This will undoubtedly be considered too high a standard for our country to achieve at this stage. It is therefore suggested that a proportion of 10-12 students per teacher should be aimed at for the time being.

An adequate staff of non-medical technical assistants is also essential in any medical teaching centre.

Post-Graduate Education

The standing drawback of medical education in our country is the general absence of facilities for post-graduate instruction, although all the universities have provided for quite a number of post-graduate degrees. However, the present conception of post-graduate education which the author has in view is not only the arrangement of facilities for post-graduate higher degree in this country but also and mainly the provision of opportunities for specialisation with or without post-graduate degrees. As a matter of fact, more emphasis should be put on specialisation than on degrees. Since it has been already indicated that the under-graduate teaching should not at any stage involve into the provision for specialisation except that the students during their studies should be able to select their own line of specialisation by putting in extra emphasis on the subject of their choice and obtaining the necessary credit, it is necessary that the specialisation should be obtained by actually working under a teacher as apprentice and then, if required appearing for a specialists' examination before a Council or Board specially constituted for the purpose. For the post-graduate degree course, however, it is essential to establish in every province one or more post-graduate medical institute with hospital and other facilities, where different branches will be adequately represented and facilities provided for proper studies. A properly constituted committee or council should immediately take the problem in hand.

Refresher Courses

Medicine is a live and progressive science, with a plethora of researches during the two great World War resulting in many new discoveries and advancement of knowledge. To keep the basic doctors abreast with such advancement provision should be made for them to take refresher course every five or six years. The same is perhaps more true for the specialists. The refresher course for the basic doctors should be arranged in the undergraduate medical colleges and the period of training should not ordinarily exceed 3 months. The specialists including certain grade of teachers, on the other hand, should be admitted as supernumerary staff attached to the appropriate departments in the post-graduate institutions for a similar period. Some financial aid and study leave should be sanctioned for the Government employees, and facilities for the course should be extended to private practitioners on the acceptance of a moderate fee.

Arrangement should also be made for periodical short visits of the professors of these institutions to foreign countries for the purpose of exchange of views and for developing new ideas.

Teachers

For any reconstruction programme the primary need is to produce trained personnel in as much larger number as possible. For this purpose, again, there is more necessity for trained teachers than any thing else. The latter should play the same role as the capital goods (machinery) for the production of consumer's goods. But men should be chosen as heads of departments because of their teaching and research ability.

If medicine is to be taught as a University subject it is needless to mention that there must be some radical changes in the conditions provided for the teachers. All professors and teachers of medical colleges should be employed on whole time basis and should receive adequate and compensatory emoluments in lieu of private practice except perhaps some clinical teachers of exceptional qualities whose honorary service may be availed of for the benefit of our country. At the same time the country should not stop by only producing teachers and research workers. Proper facilities and provision should also be made for their suitable employment with adequate remuneration and security of service. One of the reasons for the dearth of research talents in Medicine is that, unlike Physics and Chemistry, the medical profession is much more remunerative as a practice and thus attracts the talents towards it. To counteract this, therefore, the research workers in medical line should be offered a much higher remuneration than at present provided.

The intending teacher may be regarded as a trainee and be given adequate time for reading, reflection and research. Provision should be made for the travelling followship of suitable trainees to see the teaching and researches of other countries as well as of the different parts of their own country. A medical man, particularly a teacher must know the world and his fellows, as well as his special subjects. He should have originality, foresight, initiative, integrity and right outlook to be able to give proper and adequate guidance to his pupils by setting up his own example like Sir Thomas Lewis in the University College Hospital in London or Sir William Osler in America.

Clinical Conferences

The teacher-student relationship should be more intimate than as at present and for this purpose adequate number of junior teachers are necessary as demonstrators. Such junior staff, most of whom may be post-graduate trainees, must be given adequate and free time for their own research and reading. Unless men are thinking and exploring themselves their teaching must inevitably become dull.

In a similar manner, unless the student sees in his formative years the physicians, surgeons, pathologists, radiologists, the teacher of Social & Preventive Medicine and other specialists consulting together

in clinical conferences and learns early how their work is integrated, how are they expected to use adequately the different services later in private practice? Teachers also gain enormously by working among students and teachers, because there is a great stimulus to be gained from the enquirying mind of the young.

Form for Discussion and Exchange of Views

A special fortnightly form of teachers and students, to which the suggested clinical conference may also be merged, should be provided in each institution where not only the clinical cases will be presented for discussion but also the reviews of subjects, field experiences, reports of new discoveries, new ideas and the results of researches carried out by the teachers, students or research workers of the institute or of other places may be presented or projected to elaborate knowledge, initiate criticism and discussion and to stimulate the spirit of research and healthy competition among themselves. Time has come when various nation-building work and researches have to be done by integration, collaboration and coordination. This form will at least provide a good oportunity for exhibiting the results of such collaborative efforts and will keep every body informed about what is being done by the colleagues in other departments.

Library and Museum

Library and museum are the two vital parts of a medical institute. To a great extent the standard of education in a college is judged by the quality of these two sections she possesses. Their importance will further increase if research is also introduced in every department.

Library.—A well selected collection of books, monographs, reports and periodicals, particularly foreign, covering the entire field of medicine are essential for both teaching and research. Since the inter-relationship between medicine and other sciences such as, chemistry, physics, biology, psychology, anthropology, economics, sociology, agriculture, engineering etc. is now well recognised the progressive institutions should keep a certain stock of reference books in these sciences as well. As a matter of fact, a University Medical College can only adequately provide these facilities. The medical librarian should be able to teach the students the use of the library and medical bibliography. This understanding is essential for those who wish to carry out independent studies. If the students run a journal of their own institution with the help of their teachers they can have both the stimulus for using the library and some extra journals in exchange to improve the stock.

Medical text books.—There is also a great need of text books containing Indian data and references to Indian problems. The Indian teachers should therefore make concerted attempts, if required by joint efforts, to write and publish text books containing data collected and experiences gathered under Indian conditions. It is gratifying to note that there are, though few, some excellent text books written by our eminent teachers.

Museum.—There are many diseases or effects of diseases which the students may not come across during the course of their studies. Again, with the improvement of diagnosis and treatment many of the effects of diseases may not occur in the ordinary circumstances. To obtain at least some ideas about them, preserved specimens or at least models are the best media of imparting knowledge. Moreover, most of the effects of disease (pathology) cannot be studied in live patients; postmortem specimens are therefore essential for demonstration purposes. Thus, the museum should at least contain the following sections *viz.*, (1) Anatomy; (2) Physiology including Nutrition, Normal Growth, Indian Standard of Physical Development, Digestion and Metabolism, Malnutrition etc. (3) Pathology—General, Medical & Surgical; (4) Maternity & Gynecological specimens including Infant Growths & Abnormalities and Infant Hygiene; (5) Medico-legal specimens; (6) Section of Social and Preventive Medicine including Sanitation; (7) Health Education and Propaganda; and (8) Section of History of Medicine which may include a biological museum.

The organisation of a museum is a matter of time. The number and types of specimens will depend upon the facilities and period of collection. The sections mentioned above may be attached to the respective department but the best procedure would be to place them in one building or in one wing of a building under one curator, with facilities for every department to bring the students for demonstration purposes.

Research

Western medicine has been introduced in India for nearly one and a quarter century. Although during this period she can claim many original new discoveries to her credit, the actual contribution so far made by the sons of her own soil in the field of medical research has not been as creditable as in other sciences. Without going into the reasons it may suffice here to mention that facilities and resources have either been absent or, if at all, very meagre indeed, the entire medical education, research and relief being always under the management of an alien Government without the required financial aid and the academic influence of the university atmosphere. Medical research has therefore suffered greatly for want of proper encouragement, and whatever little has been achieved is due mostly to the personal sacrifice, zeal and efforts of a few individuals against heavy odds. This deficiency should not be allowed to persist unchanged any longer, particularly from the national point of view. Talents are not wanting in India. If it has been possible to produce top-ranking scientists in Physics, Chemistry, Botany, Mathematics, and other sciences Medicine cannot be an exception if backed by proper encouragement and atmosphere.

The function of education should be not only to impart available knowledge but also to stimulate the spirit of research in filling up the existing gaps through training in research and in the application of the scientific facts logically to the problem remaining unsolved.

The first reform that is needed therefore is that the universities should take entire charge of medical education through a properly constituted Faculty of Medicine. This body should recruit through selection board certain number of students every year with research bent of mind, who should receive some stimuli from contacts with different professors carrying out researches in their individual departments, and provision should be made for actual participation in the method adopted and in clearing up their inquisitive mind. It is time that the importance of such researches in the medical educational programme is realized and the college staff be compulsorily engaged in the solution of national problems and the students encouraged to tackle at least a few minor ones during their collegiate career.

Since the country should now give priority to the development of social and preventive medicine, special attention should be given to this aspect of research which along with surveys and social experiments must be carefully blended in evolving the method of approach to a public health social problem.

Research Committees.—Since every institution in its various departments will be expected to provide and carry out research programme it should have an institutional research committee to study the schemes submitted by different departments and to sponsor those problems which are likely to yield some useful results. This committee will also receive the periodical, interim and final reports for consideration and also obtain the necessary financial support either from the Government or from some local funds as the case may be. The proposed bi-monthly clinical meetings may be held under the auspices of this research committee through its secretary. Thus, the standard of research will be maintained and the proper utilisation of the funds assured.

This Committee should be as small as possible. Its members, chairman and secretary should be elected from amongst the senior staff of the Institute, of which one will be a statistician. At least three years should be given to such a committee to function before re-election. The first and foremost character of this committee should be 'nationalistic' and every thing should be judged on merit and on the spirit and principle of cooperation and encouragement.

Question of Medical Personnel for Rural Areas

The question of providing medical relief and preventive measures to the rural areas has been predominant in the minds of every nationalist as well as public health worker. Russia also began first with the provision of medical relief for the masses irrespective of caste, creed and locality. For the building of any nation therefore, this is a primary or essential need. On the other hand, under the existing conditions and state of affairs it is difficult to attract medical men to work in the villages. The writer's specific suggestion in the matter are reiterated here: Firstly, promising youths from the villages should be selected for medical training with/without the necessary stipends from the Government, with the specific purposes of settling them in their own or neighbouring villages. Secondly, the whole course of training will be permeated with the idea of social and preventive aspects particularly in relation to rural and field conditions. Thirdly, at the conclusion of the course every successful candidate will be compulsorily deputed, for rural work for a minimum period of one year with proper remuneration; and lastly, those who will settle in the rural areas will receive comparatively higher remuneration than those who remain in the cities so that they can be adequately compensated for their childrens' education and other personal or family amenities. It is the firm belief of the author that this method having involved no coercion will work better than other suggested methods. These basic doctors will, however, receive the benefit of refresher course for three months every 5 years at Government expense to keep themselves abreast with the advancements.

Conclusions

This memorandum has been compiled by the author as a preliminary attempt to direct the attention of all concerned including the members of the medical profession, to the problem of medical education in our country in the light of modern world trends, as they appear to him, and of the newly achieved freedom with the associated changes of outlook on various matters including our future health services. The subject is a big one, and it has just been possible to deal with the question of the Under-graduate Course. The Post-graduate Course in which is included the Specialisations is a still bigger issue and can be discussed only after the policy regarding the undergraduate course is finally determined. The author's final suggestion, therefore, is that a special committee should be immediately apointed to adequately deal with the details of the problem and to submit their report with their final recommendations to the public or public bodies and the authorities concerned for consideration and adoption.

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CASE NOTES

STONE IN BLADDER AS A CAUSE OF DYSTOCIA

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A full term Hindu woman named G. R. aged 21 years was admitted in the Maternity ward, Shree Sayaji General Hospital, Baroda, on 5-2-48 at 9-30 A.M. She could not be delivered at home.

She was a primipara and was handled by a *Dai*. Her diet was vegetarian.

Previous history which she gave after the delivery of the child was that she was suffering from difficult and at times painful micturition since 7 years. She complained of a tumour in the anterior wall of the vagina which caused painful coitus and at times used to obstruct the passage of urine. She used to displace the tumour with her finger and then passed urine. The urine at times used to be cloudy and some gritty substance used to pass with it off and on.

She was married 10 years ago. The menses were regular. She had dysmenorrhæa and sterility for which cervical dilatation was done eleven months ago. Then she had the same complaint about the urine.

Condition on admission. Presentation vertex. Measurements of both the inlet and outlet were normal. The head had gone low down in the pelvis and was seen through the vagina on separating the labia.

P. V.—Membranes nil (they had ruptured at home).

The head was seen through the vagina. There was no promontory and no disproportion. A stony hard egg shaped tumour about the size of a hen's egg was felt at the lower end of the pubic arch as if in the anterior wall of the vagina, in front of the head and obstructing its progress. On careful examination it was found that it was not in connection with the pubic arch but was quite separate. Suspecting that it may be a stone in the bladder which struck catheter was passed into the bladder which struck against the stone and thus the diagnosis was confirmed. Red coloured dirty urine with shreds of mucous membrane and grit of the stone came through the catheter. With the left index finger and with the guidance of catheter, the stone was gently pushed up above the fœtal head. The patient could then be delivered normally but as the second stage was prolonged the baby was delivered very easily with the low forceps at 10-30 A.M. Placenta and membranes were expelled at 10-40 A.M.

Both mother and baby were well.

The case is rather unusual. The stone in bladder as a cause of dystocia is not mentioned in any text book. This stone was lying at the base of the bladder on the trigone. The base of the bladder along with the stone had been pushed down in front of fœtal head which was descending into the vagina with the pains. The swelling in the anterior vaginal wall was seen with the naked eye just below the urethral orifice obstructing the progress of the head. It was a phosphatic stone.

In such cases if the head would have been allowed to deliver without displacing the stone above the head there was a danger of vesicovaginal fistula at the site of the stone due to forcible rubbing of the bladder and the anterior vaginal wall between the head of the fœtus and the stone.

I wish to thank Dr. Miss. A. P. Thomas for keeping proper notes of the case.

RHINOSCLEROMA

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Formerly of Skin and V. D. Department, Medical College Hospital, Patna

Hindu male, 32, came under observation in 1945. Came from Jaipore State for radium treatment for cancer of nose.

History—The swelling of the nose started 2 years back as a small nodule of the left ala of the nose which went on increasing until the ulceration covered the whole of the middle portion of the upper lip and both the alæ nasi with complete closure of the nares. The edge of the growth was thickened and spreading and the shape of the nose became that of the frog. Dirty slough was present on the granulomatous growth. Hard to the feel and tender on pressure.

(1) Smear from the growth showed no *K. rhinoscleromatis.*

(2) Biopsy did not show any malignancy.

(3) Serum was Wassermann negative. Provisional diagnosis was rhinoscleroma.

Treatment—Autogenous vaccine has been found very useful (Ghosh and Panja, 1945) but it was not possible in this case; hence deep x-ray therapy was used with I. V. iodine therapy. Result was very good.

Acknowledgment—I am thankful to the Superintendent of the Hospital for permission to publish this case report.

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CEREBRAL THROMBOSIS PRECIPITATED BY VAPOUR BATH

J. M. GUPTA
Monghyr

B., 66 years, Muslim male, tailor by occupation.

Complaint—Unconsciousness of 16 days' duration. He had a previous attack of unconsciousness about 8 months ago. Right hemiplegia had followed clearing after about 2½ months.

Present illness—Four months ago he had a sudden hemiplegia of the left side while he was resting. Consciousness was not lost. Gradually his left upper and lower extremities became œdematous. A hakim was called to treat the œdema. He treated with vapour bath for nearly 20 minutes. Shortly after the

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SICKNESS ABSENTEEISM

The record of health and sickness among factory workers is maintained in very few industries in India and from the meagre data available at present an accurate picture of sickness absenteeism in Indian factories cannot be ascertained. The Industrial Health Advisory Committee of the Indian Research Fund Association recently set up a Sub-Committee to review the position with the following terms of reference:

"To see whether the introduction of legislation to enforce the maintenance of adequate records is a practical proposal."

The report of the Sub-Committee, published elsewhere in this issue, confirms the view that sickness absenteeism as a record of health survey amongst working population has been sadly neglected by every industrial enterprise.

In a recent quick survey of 34 individual industrial establishments the Sub-Committee discovered that 20 of these concerns had no arrangements for pre-employment medical examination of their workers, only 2 had facilities for re-examinations with a view to follow up the health of the workers. 'Following up of the absenteeism records with a view to analyse the health conditions of the workers was not done by any of them'. Taking this to be fairly general of the country as a whole, it is clear that sickness absenteeism records do not form part of the factory management in Indian industries. If, therefore, legislation is suggested, how best is it to be done? What exactly is the type of statistics which should be collected? What personnel are available who are competent to collect such data and the mechanism to ensure accuracy of the facts thus collected? These were some of the points the Sub-Committee sought to elucidate.

The illness of a factory worker is to some extent different from the illness of the other members of the population. A worker is generally exposed to three types of illnesses:

(*a*) Illness of the general community;

(*b*) Illness due to overcrowding which is prevalent in industrial centres, that is, non-industrial accidents and sicknesses;

(*c*) Illness peculiar to the industry itself, that is, industrial accidents and diseases arising out of specific work conditions.

The various causes of absenteeism from work can be attributed into one of the three principal groups mentioned above. According to experience in American industries, approximately 90% of the absenteeism in factories is due to non-industrial accidents and illnesses. Non-industrial injuries and illness accounted for 8·85 days of absence per employee per year and industrial injuries and accidents accounted for 0·60 days. Such specific data are not available in the case of Indian working population but in the jute mills of Bengal, for example, it has been recently estimated that the number of working days lost per month per employee is as much as 8 days on an average for all workers.

Sickness absenteeism is the study of time lost in industry from enforced absence of the workers due to illness or accidents. The study is a useful gauge to know how an individual is fitted into his working conditions, and the employer can draw conclusions whether he is getting the best out of the men he employs. The smaller industries are economically not suited to maintain absenteeism records unless a number of them could combine and keep these records on a co-operative basis. Large industries, employing at least 2000 workers or more, could perhaps profitably keep such records provided they have an industrial medical set up within the factory premises. It is essential that these sickness records should be maintained by the industries themselves. With the help of their returns the State could then assess the working conditions in particular industries and advise institutions concerned about their health problems and how to safeguard their workers from industrial absenteeism.

Production will not increase by the mere giving of higher wages to the workers as is the demand in vogue at present. Rather the workers should receive indirect help, such as, good housing, sanitation, re-

creation arrangements and other social amenities for their welfare which will, in reality, bear direct influence on the production line. In most instances, an employer will be found agreeable to provide these amenities, if reasonable and properly approached, because he has dual objectives to gain. With better working facilities, his employees will be able to give better performance at work and he will also stand on solid ground as far as public opinion of his attitude toward his employees is concerned. It is economically unsound to give unnecessarily extra money in the hands of common working man, for it only raises his purchasing power, and when the country is not producing 'good things of life at a reasonable price' the worker is liable to squander his pocket in wasteful pursuits. The trade union leaders of the country have great responsibilities but there has been very little evidence to show that these leaders are guiding the workers in this direction.

The potential resources for industrial development of India are great but unless the people who have to work, work conscientiously and remain at their posts, the outlook for the future is disconcerting. Incentives to work should be reasonable wages with healthy and pleasant working environments; and not high wages and bad working conditions. Any amount of money poured in the hands of the workers themselves will neither improve their working conditions nor indeed their living environments. A walk among the so-called cooly lines or labour quarters in the Indian factories will convince anyone about the miserable living conditions of the workers. They are badly housed and the environments are insanitary and dirty. Naturally, they fall easy victims to various diseases, social and industrial, and there is little to wonder why sickness absenteeism in Indian factories is probably the greatest in the world. The provision of hygienic living quarters, social amenities and pleasant and healthy working conditions are the duties of the employer in the first instance, and enforced by the State when necessary. The Employees State Insurance Scheme which is expected shortly to come into force is a move in the right direction.

It is appreciated that the migratory nature of the workers in India makes any statistical record, whether of sickness or otherwise, a very difficult feat to accomplish. On the other hand, shortage of skilled labour in India makes it all the more necessary that the workers should be protected against both industrial hazards and general diseases. It is deplorable that an employer is often inclined to dismiss a worker the moment he reports ill or is unable to carry on the job he is set to do instead of investigating the cause of his illness and preventing recurrence by removing it wherever possible. Crushed between these two impasse—*viz.*, tendency of the employer to dismiss a worker on the one hand, and the constant migration of the labourer in search of better jobs on the other—the industry of the country suffers. It is time that both parties realised this awkward situation and remedy the wastage incurred. Where they fail, legislation should be formulated by the State to bridge the gulf. Total absenteeism in a factory could be obtained from the pay-rolls and personnel departments, but a proper record of absenteeism due to illness really requires the presence within the factory of a medical set up with a qualified doctor-in-charge. Without a qualified doctor, such records of sickness absences would be quite useless as he is the only person fit to know whether or not a worker has truly absented himself from work because of illness or from some other cause. The Sub-Committee rightly concluded, therefore, 'that unless and until there is a provision by law to compel industries to have an industrial physician on their staff, no useful purpose would be served by legislation which enforces the maintenance of sickness absenteeism records'.

CURRENT TOPICS

SICKNESS ABSENTEEISM

The following is the report of the Sub-Committee consisting of Lt. Col. C. K. Lakshmanan, S. C. Joshi, Esq. and Dr. M. N. Rao, appointed under the Indian Research Fund Association to examine the position regarding maintenance of sickness absenteeism records in Indian industries:

Introduction

The Industrial Health Advisory Committee of the I.R.F.A. at its meeting held on 5-11-45 discussed in detail the question regarding the maintenance of records of health and sickness among factory workers. The general opinion of the Committee was that under present methods and with the present staff employed accurate data which could be used by a research worker was not available . . . A Sub-Committee was appointed to examine the present position with a view to see "whether the introduction of legislation to enforce the maintenance of adequate records is a practical proposal."

The limited experience of the Sub-Committee has been in conformity with the opinion expressed by the Committee. In a recent rapid industrial survey of thirty-four establishments it was found that twenty of them do pre-employment examinations of workers but that only two did any re-examinations with a view to follow up the health of the workers. Following up of the absenteeism records with a view to analyse the health record and reduce absenteeism was not done by any of them. It would appear from this that sickness absenteeism records are maintained in very few industries.

The value of maintaining such records does not seem to be realised by the factory owners in Indian industries. In discussing the question therefore certain fundamental questions have to be answered. What exactly is the type of statistics which should be collected, In what forms are the data to be collected? Is the mechanism or personal organisation available in Indian industries adequate for collection? What factories could be well advised to collect the information? If legislation is suggested how best is it to be done? The answers to these fundamental questions are attempted below.

Sickness Absenteeism

Sickness absenteeism is the study of time lost in industry due to illness of workers. This study is useful to the individual, in that he is in the know of his illness record and consequently he can maintain a better health status. It is useful to the employer, in that the healthier employee gives better out-turn and consequently more profits. It is useful to the community in the sense that an epidemiological assay can be made of the diseases in the community and a better control of disease maintained.

The illness of the worker is to some extent different from the illness of the other members of the population. The worker is exposed to three types of illness; firstly, to the general community health hazards like any other member in his community. Industrialisation leads to concentration of population and he is therefore exposed to the second type of illness—the illness attributable to over-crowding. That group of hazards peculiar to the type of industry he is working, forms the third group of disease the worker is exposed to.

The incidence of diseases under these three categories would obviously be different in different industries and in different countries. It is imperative therefore that whatever method of collecting sickness statistics is suggested it should be a standard one and should be such as to make them all comparable.

The Usual Methods of Assessment

The usual methods that could be adopted to assess sickness are as follows:

1. Analysing the out-patient statistics of the clinic in the industry.
2. Analysing the in-patient statistics of the hospital.
3. Analysing the mortality statistics of the industrial workers.

The out-patient statistics may or may not represent the correct morbidity figures of the entire industry. It has been our experience that in a small proportion of the industries the worker does not avail himself of the available medical facilities either because he does not believe in the efficacy of the doctor or the system of medicine he practises. Moreover the reliability of out-patient statistics of any hospital depends on a number of factors. The chief of them are the type of medical man diagnosing the case, the time and laboratory facilities at his disposal to diagnose each case, the knowledge of the past history of the case, and to a fair extent the physician's knowledge of industrial processes. Hence we are of opinion that morbidity evaluation from out-patient statistics may not be of great accuracy.

On the other extreme are mortality statistics. These can not offer a true picture of sickness as there are many diseases which incapacitate but are seldom fatal.

The in-patient statistics of an industrial hospital though giving valuable information regarding the common types of illness are only representative of a biased sample. The sick patients in the hospital do not represent the true cross section of the sick workers in the industry.

The only reliable method of assessing sickness in an industry would be to go into the details of the cause of each absence and if it is found to be due to sickness, to go into the details of illness.

The Ideal Method

By going into such details of the cause of each absence the various causes of each absence could be classified as:—

(*i*) Social reasons. (*ii*) Non-industrial sickness. (*iii*) Non-industrial accidents. (*iv*) Industrial accidents. (*v*) Industrial illness.

Due to lack of available Indian data, American experience is quoted here. Ordinarily it is roughly estimated, from data from various industrial groups, that approximately 90% of the absenteeism experienced by most organisations is due to non-industrial accidents and illness, illness making up the bulk of the cause of absenteeism. The other 10% is due to industrial accidents and industrial illness, with the industrial accident proportion predominating. One of the large scale inquiries in the U.S.A. showed that non-industrial injuries and illness accounted for 8·85 days of absence per employee per year, industrial injuries accounted for 0·59 days and occupational disease for 0·01 days. From experience in India and the U.S.A., it is felt that absenteeism due to social reasons and non-industrial illness would be more and that due to non-industrial accidents less in India than in United States. It is obvious however that an ideal sickness absenteeism record should take into consideration for both absolute and relative appraisal, all the other causes of absenteeism also.

The complete sickness absenteeism record provides facilities for further analysis. The American method has been to analyse the data as:

(*i*) The disability rate: the average number of days lost per year per worker.

(*ii*) The severity rate: the average number of days lost per absence and

(*iii*) The frequency rate: the average annual number of absences per 1,000 workers, knowing any two of the above, third can be easily computed.

The usefulness of analysing the sickness absenteeism records in the above method could be better understood from an example. (*See* Appedix I).

Rao and Ghosh while studying sickness absenteeism is a private industry during the war found that the severity rate was gradually coming down with the progress of war, though the disability and the frequency rate were on the rise. It is clear therefore that the worker is losing more time in the industry and he is absent more frequently but that each attack of illness is incapacitating him for lesser and lesser number of days for example in January 1941 each illness was incapacitating him for 6·3 days whereas in January 1944 for only 2·5 days. It is obvious that such a state of affairs is detrimental not only to the industry but also to the community where the worker is living. Each illness whether a cold or an intestinal upset is a source of infection in the factory and the community. Hence for the same loss of time, frequent short illnesses, as made out by this method of analysis are a worse source of ill-health in the community and factory than a single illness of long duration for the same period. Any study of sickness absenteeism therefore should include further analysis as suggested above.

The Recommended Schedule

Any method suggested therefore should attempt to reach this ideal. More than simple designing a schedule is the "notification, certification and verification" of the cause of absence.

Presuming that there is an industrial health set up which has all the facilities, certain basic fundamental issues have to be considered.

(*i*) The type of workers: As far as sickness absenteeism records are concerned there is no use collecting any statistics of the temporary worker. Just as in the case of health insurance schemes, only those workers that are permanent or are likely to be permanent are to be taken into consideration, as the records are likely to be more complete in these cases. But if any intensive study is contemplated in a part of the factory the records have to be maintained for every worker and provision made for the temporary and *badli* workers made during the final analysis

(*ii*) Age distribution and sex distribution effect markedly the rate of sickness absenteeism in a working place. For example a factory employing older group of workers, or more women than another factory employing the same number of workers, is bound to have a greater sickness absenteeism rate simply because women and old men get ill more easily than the others.

(*iii*) The type and amount of medical facilities available in the factory or the community: It is quite likely that the out-patient diagnosis by a qualified medical man of a worker who has a "Pyrexia of unknown origin" is malaria or influenza when he has a paratyphoid fever. Or again the visiting physician's diagnosis may be rheumatic fever when the laboratory diagnosis of the same case might be an atypical case of malaria. Thus in analysing the total sickness absenteeism of a factory or comparing the sickness absenteeism of one with another factory, the type of the physician, the facilities at his disposal etc. have to be taken into consideration. Hence the overall medical experience in considering the sickness statistics can at best be on general lines.

(*iv*) Classification of illness: Instead of entering the individual illness, British and other groups of workers favour the entry in a pre-arranged type of classification. But it has to be realised that the classification depends entirely on the type of diseases prevalent in the community. For example industrial neurosis may be the main cause of sickness in a factory in New England and gastrointestinal disorders the main cause of sickness in Bengal. Malaria or another type of illness common in Bengal might not be common in South India. Hence in the absence of any exact knowledge of the types of illnesses prevalent in India, it is much better to keep the data in such a way as to make it useful for analysis at a future

date. It is therefore suggested that in the present schedule the diseases be recorded as such, without any attempt at analysis.

(*v*) The record would be best maintained in individual schedules. Instead of anticipating completely the futre trend of results and collecting group data daily in the factory it would be much better to start individual cards from which groups of data of any permutation and combination could be done in the end to find out the incidence of 'accident proneness' or again the analysis to gauge the distribution of multiple attacks of disabling sickness might lead to some interesting results.

Hence it was considered necessary to have individual records. The suggested type of record is given as Appendix II.

The only possible criticism for this type of record is that it does not lead to easy statistical analysis especially when large numbers have to be analysed. The answer for the criticism is that our knowledge on the subject is so meagre at present that we cannot think of designing a schedule to be easily converted into a punch card for group analysis. Moreover, the card should be so simple that a social worker should not find difficulty in filling up the schedule and so thorough, as to be amenable to complete analysis.

The Type of Industry that can Afford

The recommendation of the size of the industry which should be made to maintain thorough sickness absenteeism records is not altogether easy.

The smaller industry is economically on an unstable basis and cannot possibly afford to maintain a good record system, unless on a co-operative basis. At the same time it may also be noted that in India the large majority of industries are of the smaller type. The folowing evidence in this connection is interesting.

Due to lack of available data on all establishments where labour is employed, that in factories is taken as a sample though not altogether representative. Even there, the factory data in Bengal is taken as sample to represent the whole of India. Hence while considering the above table these limitations above to be borne in mind.

Distribution of Returns by Size of Factories (Perennial and Seasonal in a Large Indian Province in 1944

Employee size class	*Percentage of returns*	*Cumulative Totals* This series	In U.S. for comparison	*Percentage of total employment (by computation)*	*Cumulative Totals* This series	In U.S. for comparison
Less than 20	13·4	..	..	0·5	..	..
21-50	36·6	50·0	..	3·4	3·9	..
51-100	20·9	70·9	..	4·1	8·0	..
101-500	17·8	88·7	63·0	11·7	19·7	13
501-1000	2·6	91·3	80	5·2	24·9	26
1001-5000	8·0	99·3	97	63·2	88·1	61
More than 5000	0·7	100·0	..	11·9	100·0	..

The important points that are obvious from the table are as follows:

1. The small sized industry is very common in India, nearly 70% of the factories employ less than 100 workers, and more than 90% of factories employ less than 1,000 workers.

2. In the United States also though the mode is the small size factory, it is not so small as in India. Nearly 40 per cent of the factories employ labour of more than 500.

3. When the data are computed in a different fashion, however, the results are even more interesting. Only a quarter of the total industrial population is empolyed in factories. (India 25 per cent, U.S.A. 26 per cent) with 1,000 employees and under *i.e.* the large majority of workers are employed in the larger establishments.

From a public health point of view therefore any measures taken for keeping health records in general (*e.g.* sickness absenteeism records) are best taken in large establishments so that a majority of workers are benefited.

The Sub-Committee considered what should be the minimum size of a large plant which should be made to maintain the sickness absenteeism records and it came to a conclusion that such of those establishments employing 2,000 labour or over must be made to keep proper sickness absenteeism records.

The large majority of such factories have already an industrial medical set up which can easily be turned to the suggested scheme of maintenance of records.

The Type of Personnel Required

Present knowledge of absenteeism in Indian workers is poor; it is poorer about sickness absenteeism. To appraise the variable proportion of sickness to other causes of absences it is considered that a medical social worker of the type of the industrial nurse or the health visitor should assist the industrial physicians.

Absenteeism may be due to indirect causes at home *e.g.* transportation difficulties from home to the place of work, housing problems, difficulties in conducting shopping and personal business, improper

arrangement at home to look after babies in arms or toddlers etc.

It might be due to certain maladjustments in the factory itself. For example, uninteresting work or a work which easily induces indifference or boredom or working hours which do not dovetail into the personal habits for the worker; in short any industrial psychological problem may be the basis of an absentee worker.

It may also be that in some cases the worker stays away at home simply because he is entitled to do so with full pay.

The worker might be absent for private reasons or he might be ill with venereal disease and still not be absent, being afraid of victimisation by the employer. In all these instances the social worker can be of immense use to the industrial physician in the correct appraisal of sickness absenteeism.

The Necessity for Legislation

Very little work on related problems has so far been done in India. The large majority of the investigations on absenteeism in general and sickness absenteeism in particular in foreign countries have been done with the help of data already collected by the establishments themselves. In Britain, the excellent work in the Welsh coal mines which formed the contents of a memoir by Bedford and co-workers was based on the absenteeism statistics maintained by the personnel department of a coal mine. The first doctorate thesis in industrial health from Harvard School of Public Health, was based on the sickness records of a public utility concern of Boston.

In all such investigations, the employers were educated about the necessity of maintaining good records for conservation of labour, and the investigations were conducted on the presumption that the records were authentic. But such circumstances do not always prevail in Indian factories. The experience of the factory inspection system in India shows that the employer does not always maintain good individual records due to ignorance of its benefits and even if the State compels him to send returns, he is reluctant to do so.

Two main points therefore emerge from this. Firstly, for the records to be of any use, they must be reliable. Secondly, for them to be reliable, better co-operation would be obtained by educating the employer rather than compelling him by legislation.

Present Legal Position in India

The only legislation in force in British India for the collection of statistics is the Industrial Statistics Act, 1942. Section 3 of the Act provides that the Provincial Governments may direct that statistics shall be collected relating to the matters specified therein Such matters include *inter alia*, under item (*ii*) of Sub-section (1), "attendance." That in its turn, may include absenteeism for any reason, such as sickness absenteeism. It is not, however, quite clear whether the item includes "absenteeism on account of sickness." If, according to authoritative opinion, that category is included, the work of maintaining statistics for sickness absenteeism would be easy. The Provincial Governments may, by notification in the official Gazette, direct the maintenance of statistics on the point in regard to specified industries. If, however, authoritative opinion expressed any doubt on the point or thinks that sickness absenteeism is not included under that item in Section 3 of the Act, it will be necessary to amend the Act, so that the employer is required by law to maintain statistics of sickness absenteeism in the prescribed manner. It may however be stated that the act itself has not been put into active operation, although it is now over four years since it was passed.

Conclusion

At present very fwe industries in India maintain sickness absenteeism records. In the interests of the health of the industrial workers it is essential that correct sickness absenteeism records are maintained. The records are essentially maintained by the Industry. With the help of their returns the State can assay and advise industries about their health problems. A schedule for the maintenance of records is suggested (Appendix II).

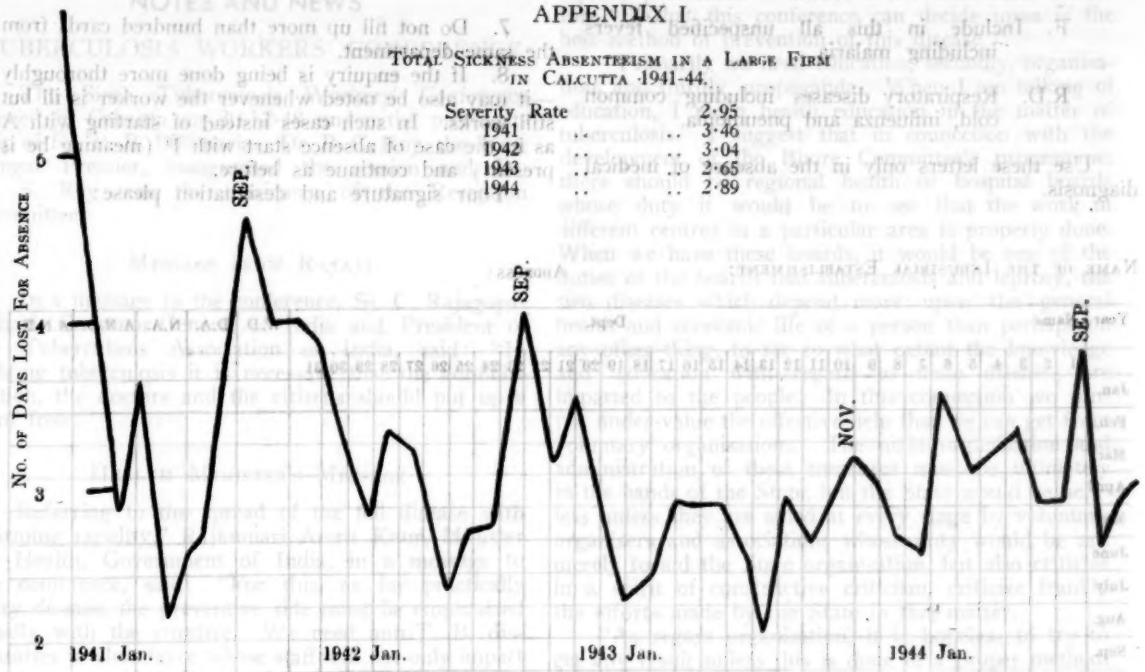
Whether the State should force the industries by legislation to maintain these records is the point in question. For example if legislation were to be passed in Bengal all the 96 industries now in Bengal employing more than 2,000 workers would have to maintain sickness absenteeism records. The large majority of them are likely to have a skeleton medical organisation. At present there is no way of enforcing the rest to have even a skeleton medical organisation. Though total absenteeism in the factory could be elicited from the pay rolls and personnel department, to record sickness absenteeism essentially requires the presence in the factory of a qualified doctor. Without the doctor, the sickness absenteeism returns would be all uncertified sickness which serves practically no purpose. Hence unless and until there is a provision by law to compel industries to have an Industrial Physician on their staff no useful purpose will be served by legislation which enforces the maintenance of sickness absenteeism records.

The social insurance scheme which is expected shortly to come into force provides for a general medical set up to record, treat and follow up illnesses —in fact theoretically ideal conditions to maintain good sickness absenteeism records. Hence we are of opinion that any legislation at present would be premature. While awaiting the comprehensive social insurance scheme, the sub-committee is of opinion that large scale industries should be encouraged to maintain good sickness absenteeism records.

APPENDIX I

TOTAL SICKNESS ABSENTEEISM IN A LARGE FIRM IN CALCUTTA 1941-44.

Severity Rate		
1941	..	2·95
1942	..	3·46
1943	..	3·04
1944	..	2·65
	..	2·89



APPENDIX II

ALL-INDIA INSTITUTE OF HYGIENE & PUBLIC HEALTH, CALCUTTA, DEPARTMENT OF PHYSIOLOGICAL HYGIENE.

ABSENTEEISM RECORD

Instructions for filling

1. Cross all the holidays (X this way) *i.e.* those days when

(*i*) either the plant is closed;

(*ii*) the worker gets his weekly day off;

(*iii*) the management legitimately permits the worker to be absent in lieu of overtime etc.

Remember the worker is getting full pay for all the days marked (X).

2. Mark off by a wavy line (——) those days he is either not in employment of this Company or on strike or discharged temporarily by the Company. Also the days before you commenced this enquiry or the day terminated this enquiry. In each case however write why the wavy line is drawn.

3. Each day (or square in the schedule) can be divided into a forenoon and afternoon whenever necessary, by a horizontal line.

4. The first day (or only the afternoon as the case may be) he is absent mark A. The letter A on any one day means that from that day onwards he is absent. If he is absent only for that day write the reason of his absence in that square only. Ask him if he is staying in a house provided by the factory. If so circle the letter A. If not do not circle.

5. If he is absent for more than one day continue drawing dashes each day and the last day (or half day) of each absence is to be marked by one of the following letters:—

C.S.—Certified sickness.
U.S.—Uncertified sickness.
C.A.—Certified accident.
U.A.—Uncertified accident.
H.W.—Home work.

6. After thus marking the first and last days of the absence write in the intermediate days the cause of absence.

(*i*) If you do not mention the cause in between, the records will be very faulty. It shows that the worker is absent for two days only; the first and last day.

(*ii*) In case of certified sickness and accident write the doctor's diagnosis.

(*iii*) In case of uncertified sickness and accidents write what the worker says. In filling use the following:—

G.I. Gastrointestinal diseases, *e.g.*, Diarrhœa, Dysentery, Stomach ache, etc.—remember typhoid fever is a gastrointestinal disease.

I.D. Other common infectious diseases. Include in this small-pox, chicken-pox, mumps and meningitis.

F. Include in this all unspecified fevers including malaria.

R.D. Respiratory diseases including common cold, influenza and pneumonia.

Use these letters only in the absence of medical diagnosis.

7. Do not fill up more than hundred cards from the same department.

8. If the enquiry is being done more thoroughly —it may also be noted whenever the worker is ill but still works. In such cases instead of starting with A as in the case of absence start with P (meaning he is present) and continue as before.

Your signature and designation please:

NAME OF THE INDUSTRIAL ESTABLISHMENT: ADDRESS:

Year	Name										Dept.																	W.D.	D.A.	N.A.	A.N.D.	A.N.E.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
Jan.																																				
Feb.																																				
Mar.																																				
April																																				
May																																				
June																																				
July																																				
Aug.																																				
Sep.																																				
Oct.																																				
Nov.																																				
Dec.																																				
																											Totals								
Analysis of sickness																																				

History Personal
Occupational

Age
Past

Years
Date
Entered

Sex

Date left

Duration

Name of the Establishment

Occupation

W.D. = Working days
D.A. = Days absent by sickness
N.A. = No. of absences by sickness
A.N.D. = Average daily No. of workers in dept.
A.N.E. = Average daily No. of workers in the whole estt.

Present:
Details of present occupation
Shifts A.M. to and P.M. to During

(*Continued from page 114*)

bath he became unconscious which was his present complaint.

On examination—Patient deeply comatose. Temperature 100°F., pulse 110 per minute, and respiration 40 per minute. Left-sided hemiplegia with spasticity and increased tendon jerks. Abdominal reflex lost in all quadrants. Babinski's sign—indefinite on both sides. Abdomen soft. Heart sounds weak. Blood pressure 190/120. Both lung bases were congested.

Progress and treatment—Usual stimulant line of treatment was adopted. But no treatment could be of any avail. His blood pressure continued to fall ultimately reaching the figure of 80/40, coma progressively deepened and he died after a few days.

Comments—It was a case of cerebral thrombosis. He was getting cured but the condition took a fatal turn after he was treated with vapour bath. That the coma was caused by the vapour bath as a result of cerebral thrombosis was proved by the fact that previous to the attack he was all right except for the œdema and hemiplegia.

The vapour bath must have acted by lowering the blood pressure to such an extent as to precipitate cerebral thrombosis. In spite of intensive treatment thrombosis persisted, and the steady fall of blood pressure with the deepening of coma indicated that the thrombosis went on increasing. It was clear that the vapour bath had produced extreme vascular dilatation with marked drop of blood pressure resulting in extensive thrombosis.

The idea of publishing the case report is to bring to light the fact that vapour bath is contra-indicated in a case of hypertension especially when there is a history of cerebral thrombosis.

NOTES AND NEWS

TUBERCULOSIS WORKERS' CONFERENCE

The Sixth Tuberculosis Workers' Conference opened in Calcutta on 20-12-48 under the presidentship of Dr. R. B. Billimoria. Dr. B. C. Roy, the West Bengal Premier, inaugurated the session and Dr. K. S. Ray was the Chairman of the Reception Committee.

Message from Rajaji

In a message to the conference, Sj. C. Rajagopalachari, Governor-General of India and President of the Tuberculosis Association of India, said: "In fighting tuberculosis it is necessary that the administration, the doctors and the citizens should put up a joint front."

Health Minister's Message

Referring to the spread of the fell disease with 'alarming rapidity," Rajkumari Amrit Kaur, Minister for Health, Government of India, in a message to the conference, said: "For this, as for practically every disease, the preventive side must be emphasised equally with the curative. We need anti-T. B. dispensaries in abundance whose staff will not only impart the necessary education to the populace but will try to isolate the infective cases. We must have more sanatoria, more hospitals and the after-care colony must be fostered whenever possible. The State must provide better housing so that over-crowding may be banished. Above all we must have food and pure milk."

Inaugurating the conference, West Bengal Premier, Dr. B. C. Roy, said that when they were thinking of tuberculosis and its problems, one had got to remember that it was not merely the question of treatment by experts as it was today, but there were other factors which also would have to be considered.

Dr. Roy said: "When you are to think of the patients, you are to think of the social and economic factors and hopes and fears and prejudices from which such a patient suffers, which unconsciously perhaps influence not to a small extent the course of the disease. This, therefore, is a real problem that you have got to face. It is perfectly true that the total number of people suffering from tuberculosis in this country, even if you take those who are infected at the stage when the disease can be communicated to others, if you want to put them in one hospital, it is an impossible task, considering the total number of infected persons and considering the paucity of funds from which we suffer, as also the paucity of personnel on whom we can depend to carry on the work of fighting tuberculosis.

"We have, therefore, got to think of something broader and deeper than merely the question of providing a sufficient number of beds in a hospital for treatment of patients. The only point that we have to think is that it is a disease whereas also in leprosy prevention is always better than cure. Therefore, all that this conference can decide upon is the best method of prevention of this disease."

"Primarily we need education, secondly, organisation, and thirdly, propaganda. When I am talking of education, I mean health education in the matter of tuberculosis. I suggest that in connection with the development of the Bhore Committee's programme, there should be regional health or hospital boards whose duty it would be to see that the work in different centres in a particular area is properly done. When we have these boards, it would be one of the duties of the boards that tuberculosis and leprosy, the two diseases which depend more upon the general health and economic life of a person than perhaps on any other thing, to see to what extent the knowledge and education with regard to these diseases are imparted to the people. In this connection we cannot under-value the effective help that we can get from voluntary organisations. The main organisation and administration of these measures must be ultimately in the hands of the State, but the State would be helpless unless they are aided at every stage by voluntary organisers and associations whose duty would be not merely to aid the State organisation, but also criticize in a spirit of constructive criticism, criticize frankly the efforts made by the State in this matter.

"As regars organisation, it is hopeless to try to get any result unless this is done in a proper method. There should not only be a central organisation, but also a district, and sub-divisional and probably thana and village organisations,—all working together with the same end with a view to produce the maximum result. With regard to propaganda, you cannot possibly combat tuberculosis even if you have money and personnel, unless you create a feeling amongst the people as to how they can avoid tuberculosis and even if they have tuberculosis, one can remain in a stage in which he cannot communicate it to others.

"You must have had a great experience of what is called B.C.G. To my lay mind, the matter seems to be very simple. It is a manner in which you can sensitize individuals and can produce immunity. It is not possible in a few years to come to a decision or it may not be desirable even to remove all those who are infected outside the source of infection. It is better that a small infection in a minimum dose is imparted from one to other so long as the individual knows how to protect himself in other respects. This is a method by which in small quantities the bacteria get into the system and gradually harmonise the system. I would suggest, therefore, that while you will consider the latest method of treatment of tuberculosis, you will also consider the question of prevention, not merely in causative terms of the disease, but also in terms of individuals and the scare from which he is suffering."

Welcoming the delegates, Dr. K. S. Ray, Chairman of the Reception Committee, said that the most advance countries in the world had reduced their tuberculosis mortality during the last 50 years by nearly fifty per cent. They had been able to do it by tackling the problem from various directions, namely, improvement of the general standard of living, sanitation and hygiene, diet, better housing,

isolation of infective cases, treatment of curable cases and intensive B.C.G. vaccination. If India was to tackle this problem she would have to carry out measures similar to that which had been tried and found effective in other countries for improvement in health and sanitation and the general improvement in the standard of living.

Referring to the rapid spread of the disease in Bengal, particularly in urban areas, Dr. Ray said that this was due to the great mingling of the population either for enjoyments or for the sake of seeking employment or for trade purposes. There were very few buildings in towns or villages which could be said to be free from tuberculosis. Of 7,000 beds in the whole of India, the number of beds in Bengal was nearly 1,000. Tuberculosis was a disease which could now be cured in its early stages and the risk of spreading could be avoided in the houses if certain elementary rules were observed.

Dr. Ray said: "The public has as much duty as the Government to tackle this problem. Even if Government alone have to do it, they will have to raise money from the public either by direct or indirect taxation. It is, therefore, the duty of the public to rely more on self-help to fight this fell disease. In addition, it is perhaps wiser to help in the expansion of the existing institutions rather than starting new ones which are bound to take a longer time. Without disclosing any confidential matter, I may state that the Government of West Bengal is also very much alive to the problem and has already appointed a Committee to go into the matter and the Committee have recommended the establishment of 3 or 4 institutions and expansion of the existing ones as well as opening of T.B. clinics. The capital cost of all these was estimated at somewhere near one and a half crores and the maintenance cost about 1 crore of rupees annually."

Reviewing the programme of B.C.G. vaccination in India, Dr. P. V. Benjamin, Tuberculosis Adviser to Government of India, said that the enormity of the problem in India could be realised from the fact that 5 lakhs of people died of tuberculosis every year, 2½ million active tuberculosis patients lived among the healthy population and most of them were infecting others. Tuberculosis mortality, he said, varied from 200 to 400 per lakh of population in urban areas and probably 100 per lakh in the rural areas. Living and hygienic conditions, poor and undeveloped areas with prevalence of epidemic diseases and malnutrition and undernutrition were causes of the spread of the disease.

"For effective control of tuberculosis", Dr. Benjamin said, "we need over 4,000 clinics and about 5 lakhs beds for tuberculosis patients. We have at present 150 clinics and about 7,000 beds. It is becoming increasingly clear that it will take many years before we can provide for the minimum requirements for isolation and treatment of all tuberculosis patients, and improvement of other factors that contribute to the spread of the disease may take longer. The question is then asked whether there is any other means by which we can stem the spread of the disease.

"While recognising the fact that B.C.G. is one of the many measures needed for the control of tuberculosis, it is considered that if extensively carried out this vaccination will check the spread of the disease and give us time to catch up in establishing other measures. We do not know exactly the size of tuberculin negative population in India. This can be assessed only after more tuberculin surveys in different areas have been undertaken. This is what is being proposed to be done during the earlier stages of the vaccination programme. Assuming that there are 100 million persons in India who are tuberculin negative, we can certainly expect to make an appreciable difference in the tuberculosis problem if we can vaccinate all these during a comparatively short period. B.C.G. claims to reduce four-fifths of the tuberculosis mortality. The tuberculosis death according to the present rate per 100 million population is 1,25,000. A four-fifths reduction would mean a reduction of 1,00,000 deaths a year. If this can be achieved, B.C.G. vaccination is certainly worthwhile and this is surely the cheapest and quickest method which we can possibly employ in India at present."

Referring to the age-groups which are to be vaccinated, Dr. Benjamin said: "It stands to reason that in our earlier attempts of vaccination we shall concentrate our attention on the age-group under 20 years of age, namely, the school-going group and the pre-school age-group. It is comparatively easy with proper propaganda organisation to secure co-operation of the school population, but it would take a long time to get at those who are confined at homes.

"The Public Health Department of the provinces", Dr. Benjamin said, "have to take a more lively and active interest in the anti-tuberculosis measures. The popularisation of B.C.G. vaccination should be the concern of the Public Health Department of each province and State. It may be that even tuberculosis clinics should come under this department. From the point of view of carrying the B.C.G. programme, it is necessary to have more tuberculosis institutions, specially the tuberculosis clinics."

In his address to the conference Dr. K. C. K. E. Raja, Director-General of Health Services, Government of India and Chairman, Tuberculosis Association of India who was unable to attend for reasons of health, said: "During the past one year the displacement of large numbers of people from their homes following the partition of India and their concentration in camps with the inevitable limitations of the ordinary comforts of life, have materially contributed to assist the existing factors which help in the spread of tuberculosis. The problem has, therefore, become even more aggravated than in the past and the need for Governments and people to concentrate on the organisation of an adequate programme of anti-tuberculosis measures has become all the more urgent."

Dr. Raja referred to India Goverment's decision to introduce B.C.G. vaccination in the country as one of the measures to promote the control of tuberculosis and the establishment of a laboratory at King Institute, Guindy, with the help of a representative of the

World Health Organisation for the preparation of the vaccine. Vaccine is now being prepared at the laboratory on a large scale. The work at the laboratory has now been taken over by Dr. Ranganathan who was specially deputed to learn the preparation of the vaccine at Copenhagen.

Dr. Raja said: "While fully recognising that B.C.G. vaccination is only one among the many measures to be adopted for the control of tuberculosis, it is felt that B.C.G. vaccination, if properly carried out, should be particularly valuable in a country where insanitary conditions, lack of facilities for the isolation of infective patients and conditions of overcrowding make it difficult for a rapid advance in the organisation of other and more permanent measures for the control of the disease. Our own view at the Centre is that in introducing this new measure, we should proceed steadily and systematically and that the preparation of the B.C.G. vaccine and its administration should be under strict Government control."

Welcoming the delegates, Dr. A. C. Ukil, Chairman, Bengal Tuberculosis Association, said that in India there were at present one bed for every thousand of infection cases which needed isolation and this was the most costly part of the programme of combating the disease. There was another item which was coming up, namely, development of radiology. Treatment, he said, occupied an unimportant place, because a large majority of the minor types of tuberculosis could be treated without surgical and extensive measures.

Dr. Ukil said that remedy or prevention of the disease lay in the fact that money should be found for raising the standard of living of the people. The raising of the standard of living would result in the elimination of the disease to a large extent. This required total national planning which would integrate all the aspects of raising the standard of living, detection of early cases, treatment and organisational work. Until and unless the purchasing capacity of the people was raised, nothing could be achieved towards this end, Dr. Ukil said.

PRESIDENT'S ADDRESS—In his presidential address, Dr. R. B. Billimoria, Chairman of the conference, said: "The whole of our attitude towards tuberculosis needs reorientation. Are we to restrict ourselves, as we have in the past, to the treatment of an individual patient, or are we to direct our efforts against the prevention of the disease itself?—prevention of an unnecessary disease." To meet such an unsolved problem, to tackle the main captain of death for our country as it stands today, requires a clearer understanding of the nature of this disease.

Dr. Billimoria added: "Every big city must be provided with fairly well equipped laboratories where the rising young medico when he has quite enough free time on his hand, can go and work." He suggested the establishment of an Institution for Tuberculosis Research.

Dr. Billimoria suggested that Government should introduce some legislation which would insist on all persons handling ready cooked foodstuffs as also teachers particularly in the junior classes to be periodically x-rayed. "I wish," he added, "we can induce our Ministry to launch a crusade against pan-supari and thus save our country from being converted into a big spittoon."

"Another sad thing to which I would like to refer." Dr. Billimoria said, is in respcet of the advice: "Go to the country"—given by medical men in the cities because there is no place in our cities to treat them. I say it is criminal to send away a consumptive without being 'taught' the meaning of infection and rest, without a practical demonstration and teaching of 3 to 4 weeks. The outcome is, you spread the disease in the country.

Dr. Billimoria said: "I can put down on paper a nice anti-tuberculosis scheme but like all schemes we have, it will remain on paper. A complete scheme would consist of detection, isolation, treatment, insurance, rehabilitation. It is a sheer folly, while conditions as at present exist (I am speaking from the standpoint of my own province of Bombay) to waste money on mass radiography, when we are doing next to nothing in cases we daily detect. If measures could be taken to prevent infectious persons from transferring their tubercle bacilli to other members of the community, greater progress would be made in a few years towards control of the disease than is ever likely to be achieved by our present methods. If I have to give our Government a scheme, knowing how our Government is handicapped at present, I would say, "every pie you want or think of spending in fighting this scourge, use it for isolating the cases. We know fully well the illiteracy of our people, their extremely insanitary ways of living, overcrowding, purdah system, insanitary eating houses and food hawking, the spitting habit, with all this before us my only plan for to-day, scheme for the State is to isolate cases, combined with the Insurance Scheme as proposed by me.

I would insist on all employers to pay everyone earning up to Rs. 500 a month a certain percentage in the form of 'stamps' with the month and year stamped that these be pasted in a special book, and that these can only be cashed during illness and not otherwise, that these stamps be income-tax free to compensate for interest.

"This then is my Anti-Tuberculosis scheme for Government to help isolation with help to the dependents by Insurance Scheme, for the medical man to find out why a person is tuberculous and not only hunt for chemo-therapeutic magic bullets and anti-biotics and mutilating operations. This disease must be given priority in a nation-wide scheme and not relegated to the background. Government in spite of all its difficulties, must start the 'isolation' scheme."

PAPERS READ AT CONFERENCE—In a paper on "Epidemiological Consideration of B.C.G. vaccination with special reference to immunity and allergy," read by Dr. R. B. Lal a suggestion was made that B.C.G. mass vaccination should be practised in urban areas and that the selection of groups should be guided by the two principles, namely, (1) avoidance as far as possible of the group that are not likely to benefit by inoculation, and (2) inclusion of as large a proportion

of the non-immunes as possible, who could benefit by B.C.G. vaccination.

Dr. K. S. Ranganathan, Director, B.C.G. Laboratory, at Guindy, Madras, in a paper on "B.C.G. Vaccine and its preparation" suggested a scheme for mass vaccination of children and young adults and stressed the imperative necessity for the development of a preventive outlook on the part of physicians as in the case of other infective diseases.

THIRD GUJARAT & KATHIAWAR PROVINCIAL MEDICAL CONFERENCE, SURAT

Under the auspices of the Gujarat and Kathiawar Branch of the Indian Medical Association, 3rd Provincial Conference of medical men of Gujarat, Cutch and Kathiawar will be held at Surat on 25th, 26th and 27th March, 1949.

Besides conference there will be an exhibition of pharmaceutical products and surgical and medical appliances. Very interesting scientific section is arranged and there will be symposia on amoebiasis, filarisis and abortions. Particulars may be had from Dr. P. R. Trivedi, Honorary Secretary, Gujarat and Kathiawar Provincial Branch of I.M.A., Ahmedabad.

U. P. MEDICAL COUNCIL

The following is the excerpt of the minutes of the meeting of the United Provinces Medical Council held at Lucknow on 20-11-48:

The case against Dr. Pran Nath Seth was considered and it was unanimously decided that the case against Dr. Seth be closed.

The case against Dr. Harkishan Singh Ahlowalya was considered and, after hearing him and his two witnesses, the Council unanimously found him guilty and directed the Registrar to remove his name from the medical register. It was further unanimously carried that he may be permitted to apply (with necessary certificates) for restoration of his name after a period of two years.

The case against Dr. Shyam Behari Lal Srivastava was considered and, after hearing Dr. Srivastava who expressed unqualified regret for his mistake, the Council found him guilty, but in view of his expression of regret, unanimously decided that he may only be warned this time.

Resolved that this Council was in agreement with the following resolution of the Madras Medical Council and that they may be informed accordingly.

"That the primary registration of basic qualification should be in the register of the Council in whose jurisdiction the University or Examining Body is situated."

The orders of the President permitting the registration on payment of Rs. 5 only of practitioners who were registered in the United Punjab, but have now been registered by the East Punjab Medical Council, were confirmed and it was agreed to that the reciprocity of free registration which existed with the United Punjab Medical Council should now be extended to the East Punjab Medical Council provided the East Punjab Government reciprocates.

The notice given by Dr. Jagdish Prasad to file a suit was recorded and the Council directed that his attention may be drawn to Section 28 of the United Provinces Medical Act of which a copy may be forwarded to him.

The recommendations of the Standing Committee were accepted and it was further decided that the Secretary of the Indian Medical Association may be informed that the supply of Council's notifications to his association was not obligatory under the provisions of the United Provinces Medical Act, or under the election rules, and that the notifications and proceedings are supplied for information as a matter of courtesy which the Council have assured themselves, by a reference to the records, has been uniformly extended to his association.

WEST BENGAL COUNCIL OF MEDICAL REGISTRATION

The attention of all practitioners registered under the Bengal Medical Act, 1914, is invited to the following addition made by the Council, at their meeting held on the 17th September 1946, to the list of "Some Objectionable Practices" in the Code of Medical Ethics, Part III, published in the Appendix to the Annual Medical List issued in 1947:

"Taking joint action by practitioners belonging to a hospital to abstain from duty or going on strike as such action is detrimental to the interests of health and safety of the patients whom they are appointed to serve. It is open to an individual practitioner, however, if he is not satisfied with the terms and conditions of his service, to resign his post after giving at least one month's notice to the authorities of the institution."

CARDIOLOGICAL SOCIETY OF INDIA

Cardiological Society of India has decided to grant two Research Fellowships of the value of Rs. 3,000/- each per year for two years, to young men or women, preferably those that are preparing for higher examination, for carrying on research work on subjects of cardiological interest. There is also a provision for extension of the tenure for further one or more years on approved work.

Applications for the same should be sent by registered post to the Joint Honorary Secretary, Cardiological Society of India, 67, Dharamtala Street, Calcutta-13, so as to reach him not later than 15th of March, 1949 for consideration by the Scientific and Research Sub-Committee as well as the Executive Committee of the Society. The names of the recipients of the Fellowships will be communicated to them by the 15th of April, 1949.

The applicant should give in his/her application the following, without which no case will be considered:

(1) the name of the institution where he/she proposes to work;

(2) a short summary of the actual nature of the work he/she proposes to conduct, which as far as practicable, should be concerned with one specific problem and not with several problems;

(3) a short resume of the relevant literature available on the proposed research. (This will ensure that the worker is not treading over ground which has already been adequately covered).

(4) twelve typed copies of (2) and (3) should be sent along with the application for consideration by the different members of the Committee.

Recipients of the Fellowships will be required to submit a short report of the actual progress of the work every three months for the first six months, thereafter every six months till the conclusion of the enquiry or the period of scholarship, whichever is earlier.

The application should be forwarded by the person or persons whose practical help and direct guidance will be available to the worker in carrying on the work and who should also testify to the abilities of the worker to carry on the proposed work.

All other enquiries in this connection should be made to the Joint Honorary Secretary, Cardiological Society of India, 67, Dharamtala Street, Calcutta-13.

SCIENTIFIC AND INDUSTRIAL RESEARCH IN THE UNITED KINGDOM

This following abstract of the report on the work of the various Laboratories in the D.S.I.R. (U.K.) is intended to be circulated to the different organisations like the National Laboratories, Universities and Research Institutes in India engaged in scientific work, with a view to enabling individual workers to ask for further details regarding specific papers or topics, if any, which are of special interest to them. (It is issued from the office of the Scientific Liaison Officer, India House, Aldwych, London, W.C. 2).

Chemical Research Laboratory—This laboratory consists of the following divisions and the general lines of work pursued are indicated:

Corrosion of Metals—Investigation of corrosion in immersed and atmospheric conditions with a view to prevention of rusting, tarnishing and corrosion of ferrous and non-ferrous metals in industrial use.

Investigation of the microbiological corrosion of metals, particularly in soil, by the influence of sulphate-reducing bacteria.

The investigation of *ad hoc* corrosion problems of industrial importance.

Inorganic—Investigation of semi-rare metals, especially their isolation from wastes and low-grade sources.

Study and development of physical methods of analysis.

Development of microanalytical methods and other new techniques.

High Polymers and Plastics—Determination of the relations between structure and properties of high polymers and plastics.

Preparation of improved plastic materials such as glues and iron-exchange resins.

Coal Tar—Isolation and identification of tar constituents employing the newest methods of separation and analysis.

Determination of the physical and physico-chemical constants of tar constituents and derived or related substances.

Development of new uses for tar products and other derivatives.

Organic Intermediates—Study of high-pressure operations and of the production of useful chemicals by such operations.

Preparation of compounds capable of polymerization, or copolymerization, particularly those containing silicon.

Recent work from this laboratory is in notes with the following titles:

Synthesis of Benzaldehyde, a Possible Route to Toluene Chemistry and New Materials.

Patent Specification No. 598,036. (Application No. 22272/45) Improvements in or Relating to the separation of 3-Picoline, 4-Picoline and 2; 6-Lutidine.

Patent Specification No. 597,854. (Application No. 8779/46) Improvements in or Relating to Emulsions.

Microbiological Problem in the Manufacture of Sugar from Beet. 1. Corrosion in the Diffusion Battery and in the Recirculation System.

High Speed Rotor Apparatus for Accelerated Tests of Paint for Underwater Service on Steel.

Recent Progress in Research on Corrosion and Microbiological Corrosion at the Chemical Research Laboratory Department of Scientific and Industrial Research, Teddington, England.

Some Recent Contributions of a British Corrosion Research Group.

The Chemistry of Silicon Polymers.

Food Investigation Organisation—The following publications have been issued:

Leaflet No. 2—The preservation of fruit and vegetables by freezing.

„ No. 9—Entrepot cool storage of fruit and vegetables.

Special Report No. 50—Aluminium and Aluminium Alloys in the Food Industry.

„ „ No. 53—The Physics of drying in Heated Air with particular reference to fruit and vegetables.

An Index to the Literature on Food Investigation is issued from time to time.

The title of a recent Review from this organisation is: "A Brief History of the Low Temperature Research Station, Cambridge.

Pest Infestation Research Laboratory—Sprays for use in warehouses, finding substitutes for pyrethrum; exploitation of D.D.T.; controlling of "clothes" moths, "domestic" insects etc. are some of the problems tackled in the laboratory.

While referring to the work of this laboratory, mention must be made of the Colonial Insecticides Committee of the Colonial Research Council. This Committee has just been set up and deals with Insecticide Research in the Colonies. Work done covers several topics of a wide variety and a few of the illustrative titles are given below. The results and the processes evolved are likely to be of particular interest to a tropical country like India,—Malaria Eradication Experiment, Mauritius.

Mosquito Eradication, Cyprus.
Aircraft experiments against Tsetse in Zululand.
Experiments with the use of smoke.
Insecticide Research in East Africa.
Groundnut Scheme, Tanganyika.
Anti-locust Research.
Effect of sunlight on the Residual Properties of D.D.T. and B.H.C.
Protection of timber from Termite attack.

This Committee is interested in Insecticide work in India and has asked for reports.

Water Pollution Research Laboratory—Publications issued are:

Technical Paper No. 10—Flax Retting with Aeration: A process of Re-using an industrial waste water.

A Book—The treatment and Disposal of Industrial waste waters.

Titles of recent notes from this laboratory are:

Treatment of waste waters from pickling of steel.

Report on experiments on softening of hard waters by aeration.

Treatment of sewage effluent by filtration through sand at Luton, Beds.

Biological filtration at Luton-sewage-disposal works. Description of experimental plant.

The action of bacteria on inorganic cyanides.

Removal of sulphate from water by biological action.

Technical Paper No. 10 describes a new process of flax retting from which no waste water is discharged.

A summary of current literature on the subject in the form of abstracts is also issued from time to time. Main topics dealt with in this laboratory have a bearing on sewage, industrial waste waters and polluting effects of these.

When the manufacture of D.D.T. was first taken up, considerable difficulty was experienced in disposing of some of the waste liquids produced. At the instance of the Ministry of Supply, this problem has been tackled by this laboratory and their advice and observations are published.

THE SECOND COMMONWEALTH & EMPIRE HEALTH & TUBERCULOSIS CONFERENCE

The Second Commonwealth and Empire Health and Tuberculosis Conference under the auspices of the National Association for the prevention of tuberculosis will be held on 5th, 6th, 7th and 8th July, 1949 at Central Hall, London (opposite Westminster Abbey).

The provisional programme covers a very wide range of subjects including: Trends in the modern treatment of tuberculosis including streptomycin and P.A.S., the policy of B.C.G. administration; the organisation of comprehensive tuberculosis schemes in a British colony and psychological and social re-adaptation in industry.

W.H.O. CONFERENCE ON STREPTOMYCIN

At the third session of the Interim Commission of the World Health Organisation, at Geneva, in April, 1947, it was resolved to set up an expert committee on tuberculosis. In the first report of the committee (*Bull. World Health Org.* **1**:205, 1948), accepted by the Interim Commission, the various field activities and techniques for tuberculosis control were set out and it was stated that the best contribution which W.H.O. can make to tuberculosis research would be in developing and recommending uniform procedures. Special problems would require the services of sub-committees who were expert in highly specialised fields. Among the most urgent of these problems was the evaluation of new chemotherapeutic agents such as streptomycin, and accordingly a conference on streptomycin therapy in tuberculosis was convened in New York on July 30 and 31. The following experts attended: Prof. K. Choremis (Greece), Prof. C. Cocchi (Italy), Dr. Robert Cruickshank and Dr. M. Daniels (United Kingdom), Prof. R. Debre (France), Prof. R. Dubois (Belgium), Dr. H. Corwin Hinshaw and Dr. H. McLeod Riggins (U.S.A.), with Dr. H. E. Hilleboe (U.S.A.), a member of the parent committee, as chairman. In addition, American experts in different fields of streptomycin therapy and in the pathology and bacteriology of tuberculosis were invited to attend the meetings.

In the first three sessions the discussions covered the general principles of chemotherapy in tuberculosis, the results obtained with streptomycin in different forms of tuberculous infection, studies in combined chemotherapy, and laboratory methods for the diagnosis of tuberculosis and for the control of streptomycin therapy. A strong impression from the reports of members from some European countries was that acute tuberculosis in childhood (tuberculous meningitis and miliary tuberculosis) was much more common

there than it is in the U.S.A., and that results with streptomycin in these acute childhood infections were more encouraging than earlier reports had suggested. The present position in the chemotherapy of pulmonary and surgical tuberculosis in the U.S.A. was reviewed by Dr. J. Barnwell, of the Veteran's Association, who analysed over 3,000 treated cases (shortly to be published); by Dr. Hinshaw, representing the Trudeau Society; and by Dr. Riggins, representing the American Tuberculosis Society, while Dr. Floyd Feldman outlined the trials now being sponsored by the U.S. Public Health Service. The tendency in American centres is to reduce dosage to 1g. per day (or 20 mg. per kg. body-weight), with a resultant reduction in toxic reactions but with little obvious change in therapeutic effect, and to shorten the duration of treatment to 60, 42, or even 28 days in cases of pulmonary tuberculosis in the hope of preventing or minimising the development of streptomycin-resistant strains of the tubercle bacillus. Remarkable results were reported by Dr. Edith Lincoln in the treatment of small groups of cases of tuberculous meningitis and miliary tuberculosis with streptomycin and 'Promizole' (a sulphone compound), the latter drug being continued for many months after streptomycin therapy was stopped. Dr. Daniels described the organisation, under the aegis of the Medical Research Council of the streptomycin trials in tuberculous meningitis, miliary tuberculosis, and progressive bilateral pulmonary tuberculosis in Great Britain. Laboratory methods were discussed by Dr. Cruickshank and Mr. W. Steenken, while Dr. R. J. Dubos made a strong plea for discarding "egg-concoctions" in favour of the oleic acid and bovine albumin diagnostic medium for the isolation of the tubercle bacillus (*Am. Rev. Tuberc.*, **56**:334, 1948).

At the final session, attended only by members of the W.H.O. sub-committee, recommendations were drafted concerning the use and value of streptomycin in tuberculosis. The following points were stressed:

In most forms of tuberculosis streptomycin is at best an adjuvant to other recognised therapies; its use is not devoid of risk of the development of toxic reactions, and more serious, of streptomycin-resistant tubercle bacilli which may be transmitted to exposed contacts.

The drug should at present be distributed through Government or other responsible health agencies to hospitals and institutions where it can be used under expert supervision. Patients with tuberculous meningitis and miliary tuberculosis in whom the use of the drug can be a life-saving procedure should have priority.

In certain other forms of tuberculosis—*e.g.*, acute pulmonary, tracheobronchial, sinuses, and fistula—streptomycin, judiciously used, could be a useful adjuvant form of therapy.

Size and duration of dosage could not yet be defined within narrow limits.

The wide variations in methods of reporting the results of streptomycin treatment from different centres made comparisons of the efficacy of different therapies impossible, and the committee urged the adoption of certain minimum standards of reporting which will render such comparisons possible and valid.

W.H.O. should continue to encourage and facilitate international study and co-operation in researches on the chemotherapy of tuberculosis.

The memorandum embodying these recommendations has now been accepted by the tuberculosis expert committee and forwarded for approval to the executive board of W.H.O.

After the conference, the delegates made a week-end outing to the Homer Folks Sanatorium, Oneonta, belonging to the New York State Department of Health, where many clinical and laboratory problems in the streptomycin therapy of tuberculosis were discussed in detail.—*Lancet*, **2**:626, 1948.

THE DEATHS OF DOCTORS

In assessing a fair remuneration for general practitioners the Spens Committee (*Report of the Inter-departmental Committee on Remuneration of General Practitioners*, 1946, H.M.S.O., London), pointed out that the strain of medical practice shortened the expectation of life of doctors, who have a mortality rate 34 per cent above civil servants and 26 per cent above professional engineers. Unfortunately, owing to the war, no up-to-date occupational mortality statistics are available for this country, but the gap has been partly filled by recent American reports on the longevity of physicians. A comparison between the mortality experience of doctors and the remainder of the male population over the age of 25 shows that, although the main causes of death among doctors are not appreciably different from those among the white male population as a whole, the relative importance of the individual causes varies considerably between the two groups. Thus, although the overall death rate for doctors in the U.S. is little higher than that for the general male population, the advantage held by doctors under 45 is largely out-weighed by their heavy death rate at later ages. This divergence is due to the differential mortality from specific causes of death.

The mortality ratios, which express the proportion of deaths actually observed among doctors to the number to be expected at the rates prevailing in the general male population, show that the former have an unduly heavy death rate from leukæmia (M.R. 1·75), biliary calculi and gall-bladder disease (1·45), cerebral hæmorrhage (1·2), diseases of the heart and coronary arteries (1·18), and arteriosclerosis (1·16). On the other hand doctors have a death rate below general expectation from automobile accidents (M.R. 0·81), appendicitis (0·77), hernia and intestinal obstruction (0·75), nephritis (0·73), peptic ulcer (0·62),

diseases of the prostate (0·54), tuberculosis (0·45), and syphilis (0·34). Clearly this latter group of causes of deaths comprises just those diseases whose fatality rates can be reduced by early diagnosis and rapid and effective treatment. Most of the causes of unduly heavy mortality among doctors on the other hand, are those believed to result from the stress of a harassing existence which weighs most heavily on men past their physical prime. Thus, although the expectation of life of a young doctor of 25 is slightly higher than is usual in the population—43·5 instead of 43·3 years—this advantage is lost by middle age, when, at the age of 55, a doctor has an expectation of life of 17·9 years, six months less than the general expectation.

These findings have two important implications. The first is that, despite the disregard which many doctors notoriously have for their own health, their favoured position, both professionally and socially, does result in a lessened mortality from diseases amenable to detection and treatment. Their cancer experience, which is particularly good for neoplastic disease of the digestive tract, is a powerful argument in support of the campaign for early recognition and treatment of cancer. Conversely, their high death rate from cardiovascular diseases cannot be entirely explained by better diagnosis, though this, rather than any specific occupational hazard such as x-ray, may be the reason for the exceptional mortality from leukæmia, which is shared by men of social class I in this country. There is, then a need for special study of the occupational and constitutional background of those "stress diseases" which so often cut down men at the peak of their maturity and usefulness, both in our profession and in others.—*Brit. M.J.*, **1**:212, 1948.

ANTI-TUBERCULOSIS WORK IN AUSTRALIA

Norman Bartlett writes: The Australia Federal Government plans to spend Rs. 40,00,00,000 over the next 20 years in an effort to reduce tuberculosis to a problem of minor importance. In Melbourne recently (June 29-30) the Federal Health Minister, Senator Nicholas E. McKenna, met State Health Ministers to discuss preliminaries for launching an Australia-wide campaign.

The Australian tuberculosis death rate of 33 per 100,000 inhabitants compares favourably with other countries. In 1945, for instance, the New Zealand figure was 38 per 100,000 inhabitants, the United States of America, 40, England and Wales, 56, Scotland, 74, the Netherlands, 86, France, 106 and Finland, 157.

The Federal Director of Tuberculosis, Dr. Harry W. Wunderly, believes that under Australian conditions the disease can be controlled still further and eventually reduced to a minor diseases category in its public incidence. In a recent survey Dr. Wunderly found that between 30,000 and 40,000 Australians suffer from tuberculosis, in a total population of 7,580,820.

At the conference, Ministers agreed to recommend that the State Governments appoint full-time Directors of Tuberculosis, establish case registers to provide central, complete and easily accessible records of vital facts relating to tuberculosis patients and contacts and introduce legislation making notification of tuberculosis compulsory on bacteriolgoical evidence or on "reasonable evidence." "Reasonable evidence" is taken to mean clinical condition supported by radiological evidence.

Compulsory X-Rays Rejected—Ministers disagreed about the need for compulsory x-ray examination to detect the presence of tuberculosis. They decided to maintain the present system of voluntary examination coupled with public health campaigns. They agreed, however, to ask the Federal Government to draw up a draft bill for submission to State Governments embodying the requirements for a general compulsory examination "in appropriate cases and at appropriate times."

"Health Ministers will be open to criticism if they fail to face up to the need for compulsory x-ray examination," Senator McKenna warned the conference. "An educational campaign will make the people realise how necesasry is the need for examination."

"All infectious cases must be located regardless of bed shortage," declared Dr. Wunderly in a report, which was the basis of conference discussion. "Epidemiologists claim that it is necessary to survey at least 80 per cent of the population aged over 15 years within a short time if tuberculosis is to be controlled quickly. With the present shortage of trained staff and suitable equipment it is essential, however, to limit case-finding surveys, in the first instance, to those areas and industries in which the incidence of tuberculosis is already known to be high."

Dr. Wunderly recommended that a start should be made with the following: (1) the populations of capital cities and suburbs; (2) working miners; (3) food handlers; (4) employees in big industrial concerns; (5) students in high schools, technical schools and universities; (6) school teachers and university staffs; (7) employees in public utilities such as railways and tramways; (8) members of the public service; (9) all patients attending ante-natal clinics.

Nation-wide Survey—The present campaign is the culmination of 20 years work by Australia's Federal Health Council and National Health and Medical Research Council. These bodies have repeatedly urged the need for increased accommodation, for liaison between clinics, sanatoria, preventoria and industrial colonies, for better nutrition and improved environmental conditions for patients and contacts and for special precautions for those exposed to special hazards, such as nurses.

Last year Dr. Wunderly, newly-appointed Federal Director of Tuberculosis, made an Australia-wide survey of existing facilities for the control of tuberculosis. He discovered a complete lack of uniformity

between the States in their plans for tuberculosis control. Three was, he said, a shortage of trained specialists, medical officers and nurses, an uneconomical use of beds, a shortage of sanatoria, thoracic wings and chalets and a lack of properly organized radiographic units.

Despite shortages and interruptions caused by the war, Dr. Wunderly found a widespread desire to do something practical about tuberculosis. There was also considerable unco-ordinated activity by some State Departments, municipal councils and anti-tuberculosis organisations. He hopes to co-ordinate all this scattered effort and gear it up for a planned all out drive with Federal financial backing.

Within a few years Dr. Wunderly hopes to see at least 20 mobile or transportable x-ray units operating throughout Australia besides many additional permanent chest clinics in thickly populated areas. A radiographer, a nurse and a record clerk, all specially selected and trained, will accompany each portable and mobile unit.

Tests of Aboriginals—Dr. Wunderly forsees the eventual need for a case-finding survey among Australian aborigines and the native peoples of the Torres Strait sand New Guinea. In Western Australia, a Mantoux Test has been made already. A large percentage of the natives tested showed a positive reaction.

Before the campaign is over, Dr. Wunderly hopes to see a transportable unit with its own generating plant on a trailer operating in the rugged back country of Australia's tropical north. He sees, however, many technical difficulties to be overcome before a survey of New Guinea is possible. Not the least of these difficulties will be the processing of films under tropical outback conditions.

Besides adequate financial protection for patients and their dependents, Dr. Wunderly recommends careful rehabilitation and after-care. "This part of the plan is extremely important," he says. "It is in every way uneconomical to restore a patient to useful citizenship and then let him break down again. Vocational training should commence at the beginning of residence in the sanatorium and continue right through to discharge. There must be constant supervision of patients and discharged patients. Care must be taken to see that they are re-examined at regular intervals arranged by the responsible medical authority. The follow-up of discharged patients should continue till they have been bacteriologically negative for tubercle bacilli for three years. The testing should be done at least annually for three years."

Dr. Wunderly, who comes from Adelaide, has been an active anti-tuberculosis fighter for many years. He and Mrs. Wunderly recently gave Rs. 2,00,000 to endow a series of travelling scholarships for post-graduate training in lung diseases. Two scholarships, valued at Rs. 10,000 each, will be granted each year to young Australian or New Zealand physicians. Duration of each scholarship is from one to three years. —*Australian News Letter.*

CORRESPONDENCE

[The Editor is not responsible for any views expressed by contributors]

A CASE FOR DISCUSSION

Sir,—I am putting before you the following case report for discussion.

Patient aged 28, female, had the first attack of illness described below in year 1941. Since then she had been suffering once a year for the period ending 1945. Since 1945 till 1948, at the time of writing this, she is having more frequent attacks every 3rd or 4th month.

Feeling of tingling and crawling sensation to start with and followed by heat in the areas of the skin to be affected which become red, swollen and hot after a few hours. The part affected is painful to touch or pressure and is demarcated from the rest of the skin. Part affected: For years it used to be left shoulder over the deltoid region on an area 4 in. by 5 in. and the right part of upper lip but since the last 3 attacks other areas, *vis.*, left and right arm, lower lip, thigh and cheeks are also affected at places over an area of an eight anna piece. The areas thus affected turn darker in colour and after about 48 hours begin to desquamate (scaling) leaving a darker skin behind which remains permanently dark. During desquamation the lip is cracked and very painful. The skin comes back to normal otherwise after 4 days from the onset of illness.

Previously and upto year 1946 the skin changes used to accompany invariably pain in the left kidney region (loin) but the last attack was without any such pain and followed the administration of 'Soneryl' which was given to the patient to give her sleep. A similar attack was precipitated by administration of Belladenal tablets five months ago.

General symptoms: Always a feeling of depression in heart, lifeless body, lassitude and feeling to lie down just before and during the onset of her illness. During onset all symptoms are aggravated.

Nothing abnormal was detected in the total and differential blood counts; and in urine. X-ray of the kidney revealed nothing abnormal. She was treated for threadworm and giardiasis.

I would like to have the views of our colleagues in this case as regards diagnosis, prognosis and treatment. Any other information will be gladly submitted. I am etc.

Cawnpur. L. C. KACKER, M.B.B.S., D.O.M.S.

SUPERHYPERTONIC SALINE & CHOLERA

Sir,—To combat collapse in cholera the following treatment is being adopted at the local Infectious Diseases Hospital and also in private practice by some practitioners for some years past:

Instead of dissolving 120 grs. of sodium chloride in a pint of water the same quantity is dissolved in only about 40 c.c. of water and 40 c.c. to 50 c.c. of this superhypertonic saline is given intravenously instead of the one or two pints of hypertonic saline. It is contended that the superhypertonic fluid draws

plasma from the already dehydrated tissues and thus serves to dilute the blood and raise the blood pressure. The results so far have been almost invariably disastrous.

Seven years back an article had appeared in the Journal of I.M.A. suggesting the above treatment and the suggestion seems to have been seized with avidity by some practitioners on account of its convenience. They lay man who has heard of the efficacy of salines in cholera feels satisfied that the needful has been done for the patient and blames the fate for the result.

In public interest, therefore, will you kindly state whether this procedure is rational and justifiable. I am etc.

Jubbulpore
1-7-48. T. B. SARVATE, M.B.B.S.

MEDICAL LICENTIATES

Sir,—Would you kindly take up in right earnest the following case relating to the miserable plight of the medical licentiates and publish the letter in your journal.

These doctors have covered the whole country far outnumbering the graduates and penetrating deep into the farthest corner of the remotest villages. The meaning of mass medical treatment of the country refers to the service offered by this set of doctors and their illicit offshoots,—the innumerable quacks.

If we make an assessment of both sides of the scale—the money and energy spent for completing the licentiates course and the outturn—reaching the pocket of the doctor it will no doubt cut a sorry figure. The licentiate's course of study is to all appearances a near approach to that of M.B. Many candidates who passed I.Sc. in the 1st division but could not carve out a space in the precincts of higher education had to welcome in a sportsmanlike spirit the licentiate's course. They came out of the arena successfully, quite stout and strong well nutritioned by the seeds of rational and scientific knowledge and duly stamped and officially authorised to undertake any medical, surgical and gynæcological case for treatment.

Out to earn and to live these doctors can seldom secure a comfortable corner in the profession. Hard pressed by the M.B.'s over-congesting the towns and semi-towns on the one hand and the intractable regiment of the quacks of the village front on the other these doctors find themselves placed too tight in between the two horns of the dilemma "To live or not to live." The best or the most courageous of the lot shift to the villages with due humanitarian spirit to serve the poor ignorant people of the country. Here the rich do not pay these little doctors and the poor can't pay them. The ignorance of the people is exploited in full by the quacks and the spirit of service to humanity present in the doctor runs dry in due course. He occasionally gets his clientele in his friends' circle—where the question of "give and take" is the worst crime. In rare occasions this quack or that sends for a qualified doctor as a matter of mercy to him to treat his client-patient just at the eleventh hour of his life and to wash his hands clean through the consulting doctor's cost. Lack of civic amenities, the gruesome village life and the tiresome journey to a patient's house are a few more examples that make the situation the worst for him.

Leaving aside the rural history of the licentiate's life and in opening the next chapter of the episode—one will see the selfsame sad picture. Licentiates who seek services are employed with a nominal sum as his remuneration though his services are accepted as at par with the general standard. However much experienced he may be or however much he may show his achievements—in keeping pace with time and advanced progress of medical knowledge by his lifelong study he will be none other than the little L.M.F. doctor—his stamp of the low grade denomination will never dazzle over his crown nor will it ever lift him to any topmost sevice any where in the field.

It must be said in all fairness to the licentiates that either in the service fields or in the fields of practice—M.B.'s have not always been able to corner the L.M.F.'s and occupy the highest places for them—so far practical and technical merit is concerned.

In implementing the new Government Health Scheme it has been categorically scheduled to place the M.B.'s in charge of the thana hospital and the licentiates—as M.O.'s. It will be preposterous to think that the superintendent as he is an M.B. will always perform the technical functions more efficiently and more ably than his subordinate licentiates.

That the Government has abolished the dual system of medical education due to the tenacious demand from the licentiates group augurs well for the future. It is all the more gratifying to see that licentiates are getting admitted in large numbers—for the study of the degree course. It is noteworthy, such candidates are acquitting themselves quite well showing brilliant results in the final degree examination.

But what will become of those who are on the wrong side of 40 or if the exorbitantly high cost of the training is beyond their reach?

Will the suggestion be much too wrong that L.M.F.'s with professional experience of ten years or more be given a 3 months' training as refresher course and allowed to sit for the final degree examination—or will it be too much to say that an arrangement be made to hold competitive test examinations of the applying candidates for any Government service and recruitments made on the basis of the merits thus tested. Compartmentalism in the education has been removed and the same thing should be done in the case of recruitment to medical services. Uniformity of services with senior and junior grades of division on merit basis will add new impetus to the growth of efficiency and scientific knowledge in the profession.

I beg to be excused if the writing smells of any spirit of communalism which is farthest from my mind. I earnestly appeal to the profession as a whole to make a common cause for upgrading the lot of the licentiates looking at the object in its true perspective and in the light of the above. I am, etc.

Silda.
D. N. BANERJEE, L.M.F.,
Member, I.M.A., Jhargram, Midnapore.

REVIEWS

REPORT OF THE SCIENTIFIC ADVISORY BOARD (I.R.F.A.)—1st January—31st December, 1946. Re. 1/- per copy.

A major part of the report is, of necessity, concerned with the problems of infectious diseases and nutrition Laboratory investigations have been pursued in diverse lines in different subjects. Some of the fundamental work done is in connection with Rabies (cultivation of the ætiological agent, a protozoon like body isolated by Veerraghavan, *in vitro*, and antirabic inoculation with culture vaccine); the pharmacological action of active constituents of Daemia extensa and vanda roxburghii; and antigen from Kedrowski's bacillus for the complement fixation test in kala-azar. Further, in the domain of infections, serological diagnosis of typhus and its fallacies, chemotherapeutics in cholera particularly with reference to FSA ppt (formol in sulphanilamide), D.D.T. control of insect vectors. Chemotherapeutics in leprosy, preparation of influenza virus vaccine, improved technique in the preparation of plague vaccine, use of Butea and Embelia as anthelmintics against ascaris deserve mention. In connection with nutrition, carotenoids in foodstuff, nature of iron in foodstuff, improvement of protein content of rice by improving the nitrogen content of manures, relation of essential fatty acid deficiency to reproductive failure, retardation of calcium absorption on cocoanut oil feeding, relation of protein to hæmoglobin and R.B.C. regeneration, plasma protein in various tropical conditions, fortification of cereals and fats and preparation of vit. A concentrate from shark liver have engaged the attention of several workers spread out over the whole of India. Prof. Bhide's attempts to prepare substances like calciferol in structure are certainly laudable. Unfortunately, there is very little evidence in the report, of any original clinical research. Also one seeks in vain for research on anatomico-surgical subjects barring a study on the anatomy of food in relation to infections.

H. K. Roy.

1947 YEAR BOOK OF PATHOLOGY AND CLINICAL PATHOLOGY—Edited by Howard T. Karsner and Arthur H. Sanford. Published by Year Book Publisher, 304, South Dearborn Street, Chicago. Price $3·75, D.C. 16 vo.

Since 1941, Year Book of Pathology was not published and we are glad to see the reappearance of this volume as this fills up a vacuum of the year book series. This year, a separate section on clinical pathology, under the editorship of Dr. Arthur H Sanford has been added. From a mere perusal of the famous year book quiz on this volume one is struck with the wealth of material that is contained in this book.

"In what phase of the menstrual cycle is it best to take cervical cultures for gonorrhœa?" is a typical quiz, and when we turn to page 438, we find the answer, "94·2 per cent (84) were positive during the estrogenic phases and the early part of the luteal phase of the cycle when the pH of the cervical mucus was 6·8 and above."

In addition to the usual abstracts, this volume includes the following special articles: mechanism of invasiveness of cancer by Dale R. Comman; pathology of lymphatic and hæmopoietic organs by Edward B. Smith and R. Philip Custer; correlation between vaginal smear and tissue diagnosis in 1045 operated gynæcologic cases by Malcolm S. Allan and Arthur T. Hertig; current problems of bone pathology by Henrey L. Jaffe.

Pathologists and practitioners will find quite a large amount of knowledge packed within 550 pages of this volume.

N. G. Mojumdar.

MANUAL OF LEPROSY—By Ernest Muir, 1948. Demy 8 vo., pp. 288 + viii. Illustrated. Published by E. & S. Livingstone Ltd., 16 & 17, Teviot Place, Edinburgh. Price 17*s.* 6*d.* net.

Dr. Muir, one of the pioneer workers in leprosy, and now the medical adviser to the British Empire Leprosy Relief Association and Secretary of the International Leprosy Association, has written a very handy and readable book on leprosy. It is divided into three parts: Part I gives a short explanation of the nature of leprosy, and attempts to elucidate its widely variant and puzzling phenomena, thus laying a foundation for understanding the principles of diagnosis, treatment and control. Part II seeks to deal with diagnosis, treatment and prognosis in a practical way. Part III describes the general principles of a campaign against leprosy, and particulars of the measures to be taken.

In these aims, the author has been exceedingly successful without being verbose and exhaustive. His treatment of the subject is masterly, helpful and to the point. The book is profusely illustrated. We are sure that a perusal of the book will benefit the physician specially in a tropical country

N. G. Mojumdar.

PSYCHOLOGICAL ATLAS—David Katz with 400 illustrations. Published by Philosophical Library Inc., 15, East 40th Street, New York, N.Y. Price $5·00.

Pictures and diagrams are more expressive than speech specially in a complicated subject like psychology. Their use becomes more helpful if the audience do not understand the language.

This atlas is a very good collection of pictures of both psychological and psychiatric interest. It is the first book of its kind in this branch to be published.

This will not only help the beginners to grasp the subject but also initiate others to take it up. It will be also useful to the teachers and lecturers to impart a better understanding of their subject.

The get up of the book is very good, the paper nice and the printing perfect.

C. SAHA.

JOURNAL OF THE GUJARAT RESEARCH SOCIETY, GUJARAT. July, 1948 Number, Volume 10, No. 3.

This number edited by Dr B. B. Yodh, Chairman, Medical Sub-Committee, deals with certain important subjects as "Medical and Health Problems of Maha-Gujarat," "Rural Medical Relief in Bombay Province," and such researches as were carried out in the health centres maintained by the Gujarat Research Society.

I congratulate the editors of the Journal of the Gujarat Research Society on the excellence of the July Medical Number they have produced. I realise fully well how difficult a task it is for any private Society to undertake any research in these days, especially such a complex one as that which has a reference to social conditions and social practices.

This Number deals particularly with the health of the middle class family and it is an eye-opener even to the medical profession, on account of the amount of malnutrition, deliberate or inadvertent, which exists in all strata of Society.

It teaches us that something is wrong with our mentality and with our outlook on life. Health is a subject which is almost held in contempt by our nationals in India; but it remains for such a research to tell us how deeply rooten are the evils of our mode of living; and this is exactly where the importance of such research comes in. One can easily realise that such an essential and stupendous task ought really to be undertaken by Government from year to year, so that there may be a continuity of records for future comparison. Here in India, as elsewhere, it is the social workers who have to blazen the path before Government can undertake the same.

Intensive propaganda is needed in order to show the people the importance of health problems in health centres. Even the Government efforts are haphazard and disjointed, and require a constant policy before any specific results can be achieved. Dr. Chamanlal Mehta's article shows how easily this can be undertaken if a concentrated effort is made by co-operation with the medical profession.

There are so many problems connected with food and Indian methods of cooking which require elucidation, this research is bound to lead not only to economy of food, but to improvement in nutrition.

The apathy of our people is indeed heart-rending and some of us feel that nothing less than drastic measures would suffice for making the people health-conscious. I feel that an annual health certificate should be made compulsory before a boy or girl receives admission into a school every year, or before a worker is allowed to step into the office or factory to take up his daily duties. In the end, such a law is found to benefit both the individual and the nation, from the intellectual and economic point of view.

I wish the Journal better and better support for the great task that lies before it and which the Gujarat Research Society is attempting to carry out almost single-handed. I wish the Society success in its efforts.

K. S. MHASKAR.

GARDINER'S HAND BOOK OF SKIN DISEASES—Revised by John Kinner. Fifth Edition, 1948. Crown 8 vo., pp. 250, illustrated. Published by E. & S. Livingstone Ltd., 16 & 17, Teviot Place, Edinburgh. Price 10*s.* 6*d.*

The author deserves congratulations for the new edition of the book. It is really a very good hand book for the students and busy general practitioners. The author has given many important informations of recent works on this subject. The book contains treatments particularly cited and followed by the author. The appendix will be found very useful.

Printing and get up are good.

B. N. BANERJEE

TUBERCULOSIS AND THE SUN TREATENMT —By S. N. Sinha. Double Crown, 16 mo., pp. 68 +vii, General Printers and Publishers Ltd., 119, Dharamtalla Street, Calcutta-14.

It was pleasure reading this small booklet as the reveiwer once calculated that though Indians live in a tropical country where sun's rays can be had for nothing, their children specially in average middle class families derive their quota of vitamin D from proprietary preparations. This book tries to bring back the sons of Sun back to the Sunshine. The author worked for four years with Dr. Rollier, the father of Sun treatment for tuberculosis at Leysin, Switzerland, and gained firsthand knowledge in the technique, difficulties, advantages and pitfalls of the treatment and his experience has stood him in good stead in bringing out the treatise.

The book is divided into four chapters. The first deals with the advantage of sun-bathing, the second with the historical development of the "Sun School Movement" of Dr. Rollier. Here also we find the normal routine of such a school. In the third chapter the author discusses the use of sun-bathing in non-pulmonary types of tuberculosis.

In the last chapter, prevention of tuberculosis; the author has shown how judicious exposure to sun may be used as a prophylactic against tuberculosis. Herein is also given an elaborate scheme to fight tuberculosis but we are afraid this does not really come within the province of the book.

The book is well-written and is intelligible to the common reader. It really deserves a wide circulation.

N. G. MOJUMDAR.

CURRENT MEDICAL LITERATURE

The Choice of Sulphonamides

The choice of which sulphonamide to use in any particular case depends upon several different principles:—

(1) *Degree of activity against bacteria,* usually measured *in vitro*—For all practical purposes the difference between the sulphonamides is quantitative rather than qualitative, *i.e.,* some compounds are more active than others, but there is no specificity so that one organism, *e.g.* staphylococcus, is sensitive to one compound whilst another organism is sensitive to an entirely different compound. The advantage of using certain compounds for certain infections depends rather upon the different distribution of the compounds in the body, *e.g.* sulphathiazole, which is excreted rapidly in the urine, is especially useful for the treatment of urinary infections. As measured in the test tube, sulphathiazole is probably the most active compound; sulphadiazine, sulphamezathine (sulphadimethylpyrimidine), and sulphapyridine are almost as active; sulphanilamide, sulphacetamide and similar compounds are much less active, particularly against pneumococcal infections.

(2) *Height and duration of blood concentration reached with therapeutic doses*—Sulphamerazine, sulphamezathine, and sulphadiazine (in this order) are advantageous in that persistently high blood concentrations can be produced by relatively small, infrequent doses. With sulphathiazole, on the other hand, it is more difficult to maintain a satisfactory level in the blood owing to its rapid excretion.

(3) *Distribution in the body*—Sulphaguanidine, succinyl sulphathiazole and phthalyl sulphathiazole persist in the lumen of the intestine longer than the others, and so are especially effective against dysentery. Sulphathiazole, as already pointed out, is excreted rapidly in the urine and is therefore useful in urinary infections.

(4) *Tendency to produce toxic reactions*—Sulphadiamethylpyrimidine and sulphanilamide are probably the least toxic. Sulphadiazine also causes few toxic reactions, but occasionally it causes obstruction in the urinary passages, if the patient is not well supplied with fluids. Sulphathiazole is more apt than the others to produce sensitization, *e.g.* drug fever, rash. Sulphapyridine is prone to cause vomiting and should be discarded from clinical use on this account.

(5) *Sensitization*—If a sulphonamide has been given in the two previous years, it is well to try a different compound in order to diminish the probability of reactions due to sensitization by the earlier treatment; but such sensitization often extends to other sulphonamides besides the one which initially produced it.

(6) *Expense*—The prices of the different compounds vary from time to time and up-to-date information on this subject is best obtained from the local pharmacist. A recent inquiry elicited the following prices per 100 tablets:—sulphanilamide 2*s.* 3*d.*; sulphapyridine 9*s.*; sulphathiazole 5*s.* 9*d.*; sulphadiazine 17*s.* 6*d.*; sulphaguanidine 5*s.* 3*d.*; succinyl sulphathiazole 31*s.* 6*d.*; phthalyl sulphathiazole 13*s.* 6*d.* According to this price list, the best value for the least expense is obtained from sulphanilamide, sulphathiazole, sulphamezathine, sulphaguanidine, and phthalyl sulphathiazole. The prices of these compounds when supplied under trade or brand names are often much higher.

(7) *Supply*—This was often the deciding factor in war time, but it should no longer require consideration.

Individual Sulphonamides—The chief features of the sulphonamides in common use are as follows:—

Sulphanilamide is cheap, fairly well tolerated and comparatively soluble. It is not very potent, however, and its use should be restricted to moderately severe infections by hæmolytic streptococci and to local application to the peritoneum or to wounds; it may also be used as a base for the local application of penicillin.

Table Showing which Sulphonamide to Use in Different Conditions

Condition	Sulphonamide (in order of preference)
Hæmolytic streptococcal infections	Sulphamezathine, sulphadiazine, sulphathiazole
Otitis media	
Pneumonia	
Chancroid	
Lymphogranuloma inguinale	
Gonorrhœa (if penicillin is available)	
Meningitis	Sulphadiazine, sulphamezathine, sulphathiazole
Urinary infections	Sulphathiazole, sulphamezathine
Wounds and burns (local application, if penicillin is not available)	Sulphathiazole, or a mixture of this and sulphanilamide
Peritonitis (local application)	Sulphathiazole, sulphamezathine, sulphadiazine
Bacillary dysentery	Phthalyl sulphathiazole, sulphaguanidine, sulphadiazine (or sulphamezathine)
Prophylaxis against rheumatic fever or meningococcal or streptococcal infections	Sulphamerazine, sulphamezathine, sulphadiazine

Sulphapyridine is effective but toxic and its use is not recommended.

Sulphathiazole is highly active, and not very toxic apart from its tendency to produce sensitization; it may occasionally cause obstruction in the urinary passages. It is rapidly excreted, however, and large and frequent doses are required to maintain a satisfactory blood concentration. It is a satisfactory compound for general purpose but sulphamezathine is better. Although the best sulphonamide for the local application to the peritoneum or to wounds, it has been overshadowed or supplanted by penicillin.

Sulphadiazine is highly active and in the moderate dosage produces a high and persistent blood concentration. Although it may occasionally block the urinary passages, it is relatively non-toxic. It diffuses into the cerebrospinal fluid better than sulphamezathine. It is good for insertion into the peritoneum.

Sulphamezathine (sulphadimethylpyrimidine) is similar to sulphadiazine but is more soluble and does not block the urinary passages. It also produces higher blood concentrations. It is probably the best sulphonamide for general use.

Sulphamerazine (sulphamethylpyrimidine) also resembles sulphadiazine but excretion is slow, so that the same blood concentration can be maintained with lower and less frequent dosage than is necessary with sulphadiazine. Accordingly it is particularly useful for prophylaxis.

Sulphaguanidine tends to remain in the intestine to a greater extent than the above compounds but its antibacterial activity is only moderate. Its use should be limited to moderately severe cases of bacillary dysentery.

Phthalyl sulphathiazole is not absorbed to any significant extent, but it breaks down in the intestine to liberate small amounts of sulphathiazole. It is most effective in suppressing coliform bacilli in the intestine and it is non-toxic. Its use is restricted to bacillary dysentery and to the preoperative preparation of patients before surgical operation on the colon. Succinyl sulphathiazole is similar but is slightly less active.

Thus out of the score or more of sulphonamide compounds which are readily available a small group may be selected for regular use, *i.e.* sulphamezathine for most general purposes, sulphamerazine for prophylaxis, and phthalyl sulphathiazole for bacillary dysentery and preoperative preparation of the colon. Sulphadiazine and sulphathiazole may be used instead of sulphamezathine as shown in the table. It is often an advantage to use three sulphonamides in combination as their total solubility is thereby increased and there is less danger of blocking the urinary passages. Any three out of the four sulphamezathine, sulphadiazine, sulphamerazine and sulphathiazole are suitable (HAWKING—*Practitioner*, **161**:219, 1948).

ORAL ADMINISTRATION OF PENICILLIN

EVANS (*Med. World*, **68**:327, 1948) writes that commercial penicillin tablets prepared for oral administration are effective in the treatment of penicillin-susceptible infections.

It is important to administer large doses of penicillin when giving the drug by mouth; the dosage should be three or four times that which would normally have been given parenterally, so that most cases should receive an initial dose of 100,000 units or more, followed by three-hourly maintenance doses of 50,000-75,000 units.

Oral penicillin exerts its maximum effect only if administered on a fasting stomach, and the effect is enhanced by giving citrate with the penicillin and by restricting the fluid intake.

If there is no evidence of any response to oral penicillin therapy within forty-eight hours, then the case must be reviewed and parenteral penicillin therapy or some other suitable form of chemotherapy should be instituted.

Oral penicillin is effective in the treatment of pneumococcal pneumonia, certain types of broncho-pneumonia, acute pharyngitis and tonsillitis, and cellulitis. It is also effective in the treatment of acute (uncomplicated) gonorrhoea, provided proper supervision is exercised and routine laboratory investigations are completed.

Penicillin should not be given by mouth for syphilis, subacute bacterial endocarditis, sinusitis or otitis media.

FOLIC ACID

WILKINSON (*Brit. M. J.*, **1**:822, 1948) gives in the following words the summary of his observations. The relationship of 'folic acid' (pteroylglutamic acid) and the 'folic acid conjugates' (pteroyltriglutamic and pteroylheptaglutamic acids) are considered with their effects on the hæmatological changes induced in chicks, rats, monkeys.

The uses of synthetic pteroylglutamic acid in the oral and parenteral treatment of certain diseases involving the hæmopoietic system in man are described.

Pteroylglutamic acid produces good hæmatological and clinical effects only in macrocytic anæmias with some degree of megaloblastic change in the bone marrows; it has little or no effect on patients with normoblastic marrows. Consequently the following anæmias respond to pteroylglutamic acid: pernicious anæmia; macrocytic megaloblastic anæmias of pregnancy, infancy, pellagra, sprue, steatorrhœa, and coeliac nutritional leucopenia), and possibly achrestic anæmia.

Pteroylglutamic acid acts equally well when given orally or parenterally and has no ill effects on the patient. The initial dose varies with the individual patient, but is usually 15-20 mg. a day orally, or 50-150 mg. intravenously.

In pernicious anæmia a prompt reticulocyte response is produced after the administration of pteroylglutamic acid, followed by general hæmatological and clinical improvement, but not quite so well or so rapidly as with a highly potent liver extract. A maintenance treatment of 5-20 mg. daily is necessary, but after months of treatment a lower dose often shows a fall in the blood count and hæmoglobin that will often respond to increased doses. Macrocytosis still tends to persist even after one to two years' treatment.

Pteroylglutamic acid is of no value in preventing the onset and progression or the development (which may be acute) of subacute combined degeneration of the cord in pernicious anæmia. For this reason it is not a satisfactory treatment for pernicious anæmia, and since it has no advantages over present day highly potent liver extracts or stomach preparations, it should not be given alone as routine to patients with pernicious anæmia.

Refractory macrocytic normoblastic anæmias do not respond to pteroylglutamic acid, but refractory megaloblastic anæmia may give responses.

It often relieves the symptoms of the sprue syndrome, leading to better-formed stools and some improvement in blood count, but only in the megaloblastic cases: the responses are irregular in steatorrhœa, and liver extracts may be required additionally to produce complete remissions. The response in coeliac disease may be very slow or poor; those with normoblastic marrows do not respond, since pteroylglutamic acid is effective only where megaloblastic erythropoiesis is present.

Pteroylglutamic acid has no beneficial clinical or hæmatological effects on hypochromic microcytic anæmias, hæmolytic anæmias, refractory megalocytic anæmias with normoblastic marrows, acute and chronic leukæmias of all types, leucoerythroblastic anæmia, chronic ulcerative colitis, anæmias secondary to myxoedema or hyperthyroidism, toxic or idiopathic aplastic and hypoplastic anæmias, agranulocytosis, neutropenias, and thrombocytopenic purpura, but it relieves leucopenia and thrombocytopenia when these are features of a nutritional deficiency or a megaloblastic anæmia.

There is no place in therapeutics for the "blunderbuss" preparations of pteroylglutamic acid plus iron, liver extract, etc.

Pteroylglutamic acid is not the extrinsic factor, hæmopoietin (the stomach enzyme or intrinsic factor), or the liver antipernicious-anæmia principle, nor is it the possible "neuropoietic" principle (anti-subacute combined degeneration of the cord). The effects of pteroylglutamic acid on hæmopoiesis are discussed.

There may possibly be a separate factor in liver and hog's stomach preparations with neuropoietic properties for preventing or curing the neurological symptoms in pernicious anæmia.

The anti-pernicious-anæmia potencies of substances related to pteroylglutamic acid are considered.

Hypertension: Aetiology and Surgical Treatment

Browne (*Brit. M. J.*, **1**:435, 1948) writes that it is interesting and useful to consider the probable indications for sympathectomy in the light of what we know or with what we seem to have learnt, from recent work concerning the factors producing hypertension. During the early years of the disease the blood pressure increases and remains high, often without symptoms and certainly without organic renal disease. If sympathectomy were performed in such a case it is clear that operation would not be effecting any useful purpose so far as symptoms were concerned. Since the condition at this stage may remain symptomless for a number of years it is equally probable that sympathectomy would not be a justifiable measure from the point of view of the underlying pathological process. If a sympathectomy were done too soon regeneration of the sympathetic paths might occur, and a second sympathectomy would be rendered much more difficult later in the disease, when the effect of the operation would be more beneficial. Hypertension may remain symptomless for over 20 years, and so far the experience of the operation extends only to 10 years, at the outside. There would thus seem to be no indication for sympathectomy during most of the earlier part of stage 1 of hypertension. On the other hand if operative treatment is delayed until the time when permanent arterial degeneration has occurred in the kidneys producing in them a permanent source of renin, it would equally seem to be true that the measure has been delayed too long. It would logically follow that careful investigation and observation of a patient with hypertension should have as their chief aim the determination of the following two points: the previous duration of the disease, and an estimation whether it is in a stationary phase or whether there is the slightest indication of recrudescence or exacerbation.

There is at present no clinical test available which will enable us to judge the position exactly, but it is probable that a periodic thorough and careful investigation of the retinal arteries by a skilled ophthalmologist is likely to provide the best guide to whether the onset of arterial degeneration is beginning to threaten. A periodic careful investigation of the renal function is also desirable in such cases. Finally, every case must be considered on its individual merits—general, cardiological, renal, familial, and psychological.

Care of Colostomy

Lahey (*Lahey Clin. Bull.*, **5**:130, 1947, Ref. *Am. J. Digest. Dis.*, **15**:70, 1948) writes that the correct technique for the patient to live with a colostomy is taught before the patient leaves the hospital. The bowels are regulated so that they move once every three days. At first an irrigation enema is performed every second day but by the third month every third day is adequate. With proper regulation there is no need for a colostomy bag since involuntary evacuation is rare and may be checked by a teaspoonful of paregoric. At no time are laxatives, oils, or cathartics used. Graded diets are recommended, each adjusted to cover a certain post-operative period. By the third month the diet is practically a complete normal meal. It is most important that the patient have confidence in the eventual control over his bowel movement and that the patient be made to realize that uncontrolled movements for the first six months or so are accidents which will gradually disappear.

Allergy and the Eye

The part played by sensitization in dieases of the eye has been studied experimentally and clinically for many years. Many disorders of the eye are now attributed to bacterial sensitization and to allergic reactions to foods, inhalants, and contactants. Cooke (Allergy in Theory and Practice, 1947, Philadelphia, W. B. Saunders & Co.), classifies allergic reactions of the eye into the following types: artificially induced, spontaneously occurring immediate weal, dermatitis, and bacterial sensitization. Walker (*Proc. Roy. Soc. Med.*, **40**:582, 1947) found that of 17,000 cases a year attending the Oxford Eye Hospital 340 (2 per cent) had been satisfactorily proved to be allergic both by skin tests and by removing the offending allergens and then causing the symptoms to reappear on further contact. Of these 340 cases 55 per cent suffered from conjunctivitis, 36 per cent from migraine, 2·9 per cent from keratitis, 3 per cent from iritis and iridocyclitis, and 0·1 per cent from cataract. However, ophthalmologists and allergists do not all agree on what they mean by allergy.

Duggan (*Arch Ophthal.*, Chicago, **63**:551, 1946) defines allergy to include all those aseptic or abacterial lesions in which the common element of the basic morbid process is either increased capillary permeability or excessive contraction of smooth muscle in the arterioles or both. He develops the thesis that an allergic disorder of the ocular tissues can be interpreted as a manifestation of localized vascular dysfunction. Acute congestive glaucoma, herpes zoster ophthalmicus, paralysis of ocular muscles, vascular disturbances of the retina, acute optic and retrobulbar neuritis, uveitis, sympathetic ophthalmia, serous retinopathy, and episcleritis are all discussed on this basis. Treatment is by vasodilators. Duggan has been treating many of these conditions with vasodilators for some ten years with beneficial results. In the article referred to he describes four illustrative cases of herpes zoster ophthalmicus and seven cases of paresis of ocular muscles treated by vasodilators. As he admits, controls are diffifficult to obtain, but the times taken to cure seem to be much shorter than by the more useful methods of treatment. A man of 47 with herpes zoster ophthalmicus, keratitis profunda, and cyclitis was clinically cured in thirteen days. A woman of 34 with herpes of the left side of the forehead and vesicle and marked oedema of the left upper lid, who had severe pain unrelieved for five days, was clinically cured in five days. The other two cases of herpes were in girl aged 9 and a man of 23, both of whom had mild herpetic iritis; both were clinically cured in four days. In previous cases, summaries of which he records,

marked benefit was obtained in episcleritis and scleritis, serous retinopathy, acute exudative choroiditis, iritis and iridocyclitis, and acute retrobulbar neuritis. His vasodilator therapy consists in intravenous sodium nitrite, 0·1 g. daily, with erythrol tetranitrite, 30 mgm. once or twice a day. Nicotinic acid, 100 mgm. t.d.s., with erythrol tetranitrite was used in one case.—*Brit. M. J.*, **1**:57, 1948.

Tuberculosis of the Female Genital Tract

Tuberculosis of the female pelvic organs is one of the most baffling of all the major gynaecological problems. It occurs mainly in young women in the childbearing years. Diagnosis is often far from easy and the treatment best adapted to give a cure with the minimum of disturbance of function may be hard to attain. The Swiss Journal *Gynaecologia* devoted a recent number entirely to this problem. There are two review articles, the first and longer, by Held (*Gynaecologia*, **123**:265, 1947), dealing with the aetiology, pathology, clinical features, and diagnosis and the second, by De Meuron (*Ibid*, **123**:319, 1947), discussing treatment.

The first description of the diease was apparently given by Morgagni in 1779, when he recorded a case of peritoneal and genital tuberculosis in a girl aged 14. Held has collected some figures on the incidence of the disease. In necropsies on females the incidence is 1·5 to 3 per cent and in histological material taken from females suffering from all forms of tuberculosis it is 4 to 6 per cent. Of patients admitted to hospital for gynaecological disorders 1 to 2 per cent are affected as against 10 to 15 per cent of patients operated on for swellings of the adnexa. The Fallopian tubes are affected in 80 to 90 per cent of cases of pelvic tuberculosis, the uterus in 50 to 70 per cent, the ovary in 30 per cent; infection of the uterus alone is seen in 10 to 15 per cent of such cases. Held agrees with the accepted view that primary infection of the genital tract occurs very rarely, if ever, in women, and goes on to discuss the relation of pelvic tuberculosis to tuberculosis elsewhere in the body. On this point some of his figures are unconvincing owing to the small numbers quoted.

His description of the pathological anatomy is along conventional lines, and a more interesting section is that on diagnosis. The woman with pelvic tuberculosis is almost invariably sterile. Work by Sharman (*J. Obstet. & Gynaec., Brit. Emp.*, **51**:85, 1944) and others is quoted to show the relatively high incidence of tuberculosis of the genital tract in females complaining of primary sterility. Menstrual disturbances of all types from amenorrhoea to menorrhagia and metrorrhagia are common. Held concludes that on the diathesis, other tuberculous lesions, and the local findings, diagnosis can be made with certainty on the clinical findings alone in 37 per cent of cases. Bacteriological and histological examinations are necessary to establish the diagnosis in the remaining cases.

De Meuron gives figures collected from the literature to show that the results of surgery compare unfavourably with those of the more conservative methods. Operation carries a fairly high initial mortality, and owing to bowel adhesions the formation of a fistula is a common complication. In his opinion the chief indication for surgery is to establish the diagnosis where there is uncertainty; it is also useful in evaluating the type and extent of the lesions and for dealing with such localized foci as pyosalpinx and hydrosalpinx and excising masses of caseating tissue. Among conservative measures he favours heliotherapy. Prof. Rollier gives a brief description of his method of treatment and the results obtained at his clinic at Leysin. Favourable results are also claimed following x-ray therapy, though these are considered inferior to those of heliotherapy and have the further disadvantage of causing more constitutional disturbance. De Meuron considers that tuberculin treatment is losing favour, though he is a supporter of prophylactic vaccination with B.C.G. His conclusion is that the main aim of treatment must be to obtain permanent clinical cure, since it is rarely possible with the means at present at our disposal to obtain a perfect anatomical or functional cure.

These are both highly competent articles. It is doubtful if the average clinician is sufficiently aware of the high incidence of female genital tuberculosis, though the disease is important from many aspects. It affects an important section of the community, the women of childbearing age, and it is a far from negligible factor in female sterility. Endometrial biopsy to exclude tuberculosis should indeed be a routine investigation in cases of sterility. There are also important implications in the field of hygiene, social medicine and epidemiology. Many of these infections are undoubtedly milk-borne and serve to emphasize yet again the importance of providing a safe milk supply.—*Brit. M. J.*, **1**:303, 1948.

Treatment of Pelvic Endometriosis

Schmitz and Towne (*Am. J. Obstet. & Gynec.*, **55**:583, 1948) writes that pelvic endometriosis occurs most frequently in the childbearing period and is a major cause of sterility. Conservative treatment, which will increase the possibility of conception is, therefore, the most desirable form of therapy.

A review of 130 cases treated with this intent shows that 57 or 43·9 per cent were treated by surgical procedure. Ten or 17·6 per cent required radical surgery (removal of both ovaries with or without the uterus). Forty-seven or 82·4 per cent had one or both ovaries preserved, and eleven later conceived giving birth to thirteen infants, an incidence of 23·6 per cent or a corrected incidence of 27·5 per cent.

X-ray therapy was employed in twenty-nine cases, of which seventeen were given sufficient dosage to cause a permanent menolysis. Twelve were treated with similar dosage causing a menolysis of from three to eight months. In this group two conceived and delivered three infants, an incidence of conception of 16·6 per cent. X-ray therapy in this group proved satisfactory for secondary therapy when conservative surgery had failed.

X-ray therapy of sufficient intensity to destroy ovarian function is indicated in cases where endometrial tissue has invaded the bowel or bladder. It obviates the necessity of surgical resection with its increased risk.

Watchful expectancy or male hormone therapy is of value in cases with minimal disease and symptoms in young women. It enables one to postpone more radical procedure to the years when such therapy is less costly.

Early Rising after Pregnancy

Cornell and Mullen (*Am. J. Obstet. & Gynec.*, **55**:768, 1948) write that one thousand patients were allowed up on day 6 or earlier with 80 per cent of these being up prior to day 5. These patients are apparently in much better con-

dition at the time of discharge than if they had remained in bed for eight or more days. They are in a position to adapt themselves more readily to their daily household routine. Episiotomy wound healing was not adversely affected nor was morbidity increased.

No case of thrombophlebitis occurred in those delivered vaginally, which causes us to believe the tendency toward this complication is reduced.

No case of uterine prolapse occurred. The rate of involution of uterus is increased.

When necessary, because of overcrowding, the patient may be discharged from the hospital earlier than heretofore with a greater margin of safety.

The postoperative course of the cesarean section cases is more nearly uneventful. Distention is infrequent. The necessity for catheterization and enemas is lessened when the patient is up to the toilet on postoperative day one. One case of thrombophlebitis occurred thirty days post operation.

Thyroid Therapy in Hypogalactia

Robinson (*Brit. M. Bull.*, **5**:1106, 1947) in reporting on the efficiency of dried thyroid gland by mouth in the treatment of hypogalactia observes: A series of 100 women with hypogalactia were divided into six groups receiving doses of dried thyroid gland of from 4 to 9 grains (0·25 to 0·6 gm.) by mouth, for four to eight days. It was found that the mean increase in output per day was highest in those receiving 8 grains (0·52 gm.) of thyroid daily, but the highest percentage of patients reaching an output of 16 ounces (454 c.cm.) per day occurred among those to whom 6 or 7 grains (0·4 to 0·45 gm.) daily given. Twenty-five women were given thyroxine, in dosage of 1·6 mgm. daily, for three to five days, and it was found that the mean output was equivalent to that of women receiving 8 grains (0·52 gm.) of dried thyroid gland daily. Fifty per cent of the women to whom thyroxine was given were producing 16 ounces (454 c.cm.) of milk a day before discharge from hospital, and the output continued to rise after discharge.

Prenatal Observations in Bengali Women

Nandi and others (*Internat. Med. Abstr. & Rev.*, **4**:67, 1948) present a critical review of the clinical observations on 2,600 cases of normal pregnancy in the antenatal clinic of Chittaranjan Seva Sadan, Calcutta.

Economic classification of the patients attending the clinic shows that 91·36 per cent belongs to the 'Poor' and 'Lower middle class' groups with a monthly family income of upto Rs. 200. The average number of pregnancies has been found to increase with the rise in economic status.

The maximum number of first attendance is between 32 and 35 weeks and varies from 16 weeks to full terms. The reasons have been fully discussed. With each subsequent visit corresponding decrease in the number of cases has been noted.

The average age at first child birth is 19·43 when only the primiparae of the series (868 cases) are considered, whereas the average is 18·03 years in the whole series. The average age at first child birth has steadily increased since 1925 from 15·1 to 19·43 years. The average age of mother at each child birth has been calculated from 7,754 pregnancies of 2,600 cases. The average number of pregnancies of each patient has been found to be 3·03 and 3·9 per cent of the multiparae had 10 or more pregnancies.

The incidence of abortion, stillbirths and infantile death has been found to be 7·16, 3·89 and 22·23 per cent respectively.

Of all the minor ailments of pregnancy studied, constipation has the highest incidence, *viz.*, 43·1 per cent. Diarrhœa and enlargement of liver and spleen are special features. Diseases of teeth and gums have a comparatively high incidence, about 1 in 4, varicose vein is uncommon here and is found only in 3 per cent of cases.

The study of height and weight shows the average height and weight to be 58·7 inches and 102·2 lbs. respectively. The height and weight have a positive correlation. The weight changes in pregnancy have been studied in detail. The total gain in pregnancy from 19th to 40th weeks is 16·1 lbs. or 7·32 Kg. and average gain per week during this period is 0·76 lbs. or 0·35 Kg. and average gain in each lunar month is 3 lbs.

The average figures of pelvic measurements in 819 cases show the Interspinous 21·4 cm., Intercristal 24·2 cm. and External conjugate 18·3 cm.

The height of fundus from the upper border of the symphisis pubis was measured by the pelvimeter in every case and in each visit. The average rate of growth of fundus is 0·5 cm. per week, or 2 cm. in each lunar month upto 36th week. Thence the rate decreased to 0·35 cm. per week or 1·4 cm. in the last month. The drop in the height of fundus in the 40th week has not been observed.

The distribution of different presentations shows Vertex 92·6 per cent, Breech 3·7 per cent and Transverse 0·19 per cent.

Studies of blood pressure over 3,094 readings show the average blood pressure in normal pregnancy to be 117/75 mm. of mercury. Both the systolic and diastolic readings have a tendency to rise towards the end of pregnancy. The pulse pressure remains more or less constant.

Conclusion—The present critical study based on statistical analysis proves beyond doubt the importance of statistics in medicine. Statistical methods should be taken up more and more in all clinical work in order to stimulate standardisation of observation and collection of data, as well as to make comparative study.

The observations have confirmed those of many workers on various subjects and differed materially in some cases. The authors have tried to find out the reason for the difference. Their averages in many cases are lower than those of white races.

Normalcy has been found out in many items from observations in this series. The problem in improving the standard

of health and nutrition and maternal mortality and morbidity has already been taken up by the State, and this contribution may be of some help in supplying the data.

Blood Changes in Pregnancy

Investigation of the physiology of pregnancy is still in its infancy, and has consisted chiefly in measuring the difference in various respects between pregnant and non-pregnant women. This approach is exemplified by a study of the composition of the blood of women in pregnancy and the puerperium by Hoch and Marrack (*J. Obstet & Gynec.*, **55**:1, 1948): it makes dull reading but it is a careful record and contains a quantitative critique of the methods used, which means that the data can be used for future reference, even if their present meaning is obscure. Certain changes are obviously due to dilution of blood, though the concentration of hæmoglobin suffers more than that of serum albumin and that of serum globulin is maintained. This makes the word "dilution" somewhat inappropriate. Albers found the albumin concentration further diminished in severe œdema, but the globulin concentration actually increased. In an excellent report by McLennan and Thoin (*Am. J. Obstet. Gynec.*, **55**:189, 1948) an increase in blood volume has been confirmed by an improved technique, and its extreme variability is demonstrated. This variability makes the use of average figures dangerous, but it appears that at term the average plasma volume is increased by about 40%, the red-cell volume by about 20%, and the total blood volume by 32%. No figures for hæmoglobin are given, but though Albers, *loc cit.*, Mull and Bill (*J. Lab. Clin. Med.*, **30**:458, 1945) and others have shown that the total hæmoglobin in the blood is normally increased (despite the fall in its final concentration) these figures suggest that the volume of each red cell may be increased. Adair, Dieckmann, and Grant (*Am. Obstet. & Gynec.*, **32**:560, 1936) concluded that even after making allowance for dilution of the hæmoglobin, 11·5% of their patients were anæmic but there is evidence (Whipple and Robscheit-Robbins—*J. Exp. Med.*, **76**: 283, 1942) that though the requirement for iron goes up in pregnancy, anæmia may sometimes be due to deficiency of utilisation rather than to lack of iron in the diet. The investigators point out that their average findings could not justifiably be applied to an individual; but there was no exception to the rule that the blood volume rapidly decreased after delivery, and this also agrees with previous observations. Albers points out that the decrease is chiefly due to loss of fluid (for which he has an ingenious explanation) and that postpartum hæmorrhage involves a relatively much greater loss of erythrocytes than prepartum hæmorrhage. The changes in blood volume must in some degree reflect changes in the quantity of extracellular fluid but, possibly again owing to the employment of average figures, Chesley's (*Surg. Gynec. & Obstet.*, **76**:589, 1943) measurements of extracellular fluid suggested an unequal distribution of fluid between blood and other tissues.

Two points were made in a discussion of McLennan's report. Willard Allen suggested that the abrupt change after partition coincides with the loss of an enormous store of hormones in the shape of the placenta. It has been shown in animals, including the monkey, that the placenta, after removal of the fœtuses, determines a maternal syndrome indistinguishable from pregnancy; also that the retention by a healthy pregnant woman of dietary constituents beyond her own needs starts long before the fœtus is able to use them, and indeed that while in utero the fœtus never wholly uses them. The only likely way in which such a maternal syndrome could be determined is by an endocrine adjustment, and the placenta must play a leading part. Secondly, Gordon Douglas pointed out the desirability (and the difficulty) of following individual patients throughout pregnancy instead of relying on statistical observation of large numbers.—*Lancet*, **1**:758, 1948.

Treatment of Pregnant Syphilitic Women

Goodwin and Farber (*Am. J. Syp. Gon. & Ven. Dis.*, **32**:409, 1948) write that three hundred sixty three women with varying types of syphilitic infection, who previously received metal chemotherapy, were observed through 570 subsequent pregnancies in which further antisyphilitic treatment was purposely omitted.

Twenty-two women, all of whom were originally treated with penicillin for early syphilis, were observed through twenty-six subsequent pregnancies in which further antisyphilitic treatment was purposely omitted.

Of the 596 infants born of these pregnancies during which the mothers were untreated, 549 (92 per cent) were born alive.

Twenty of the forty-eight infants stillborn or miscarried were examined at necropsy. Evidence of syphilis in the fœtus was found in none.

Of the 549 infants born alive, 88 per cent have been carefully followed for more than two months; more than 70 per cent for more than one year. All of the children followed are normal and nonsyphilitic.

These data indicate that it is not necessary to administer antisyphilitic treatment to a syphilitic woman during every pregnancy; and that there is a high degree of probability that the infant will be normal if material treatment is withheld: (*a*) regardless of the stage and duration of syphilitic infection in the mother at the time of her original diagnosis and treatment and (*b*) regardless of the interval between the previous treatment and the pregnancy in which it is contemplated that further treatment be omitted; provided that (*c*) the mother has previously received 4·0 Gm. or more of arsphenamine (or its arsenical equivalent) together with concomitant bismuth; or 2·4 or more million units of penicillin (given for early syphilis in herself; this probably holds good for a maternal diagnosis of late latent syphilis as well); and whether this previous treatment was administered during a previous pregnancy or during a nonpregnant interval; and that (*d*) the mother shows no clinical signs of active syphilitic infection; and that (*e*) the mother is seronegative (blood STS) or, if still seropositive, in low titer only (1 to 8 dilution units).

Until further information accumulates, a syphilitic woman should be further treated in any pregnancy in which she herself shows clinical evidence of active syphilitic infection; or in which, in the absence of such clinical evidence, she herself has a positive blood STS in a quantitative titer of 16 or more dilution units.